ENGINEERING NEWS-RECORD

MAY 18, 1961

PRICE 50 CENTS

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A report on the financial statements of 40 publicly held companies *p. 212*

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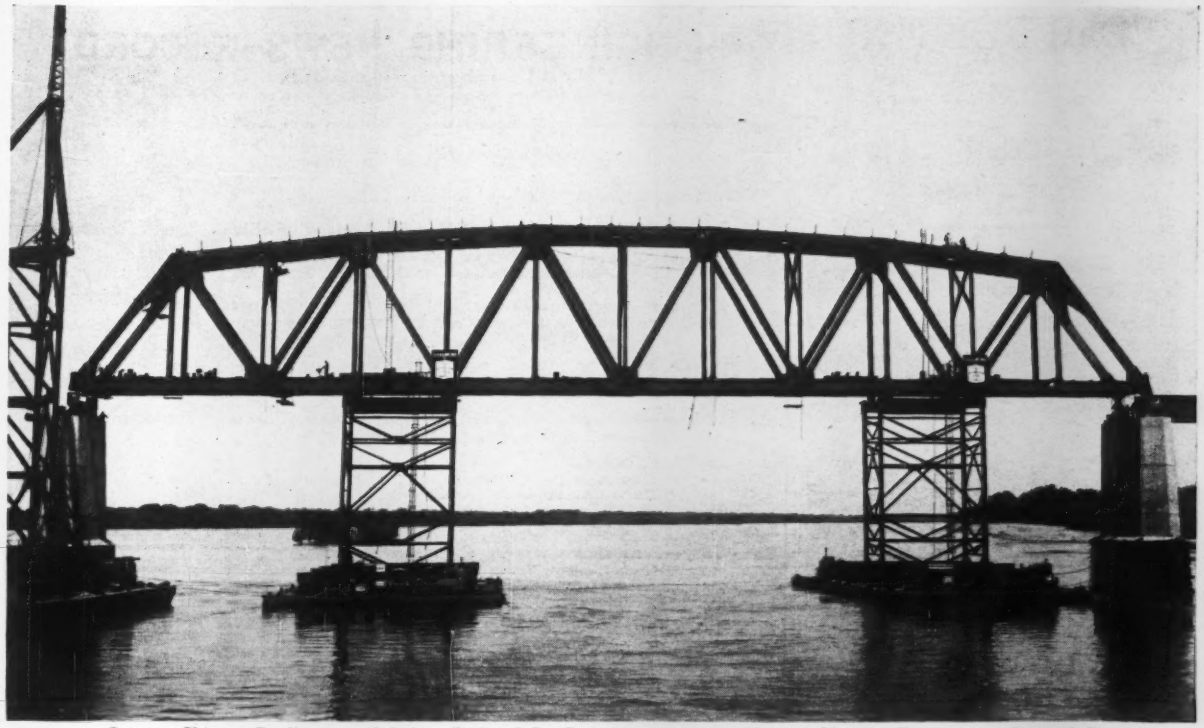
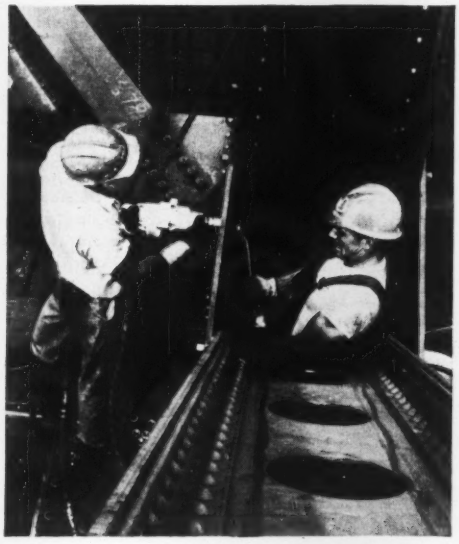


Owners: Chicago, Burlington and Quincy Railroad Co. Consulting engineers: Howard, Needles, Tammen and Bergendoff

Longest railroad bridge to be high-strength bolted



The entire 4½-mile-long, CB&Q Railroad crossing, bridging the Mississippi near Quincy, Illinois, was designed for field riveting. But unusually high flooding and difficulty in locating experienced riveting crews caused delays in completing the 336-ft through-truss span, shown above. To speed up the job, Bethlehem requested the approval of the CB&Q to bolt the remaining two-thirds of the crossing, requiring 140,000 high-strength bolts.

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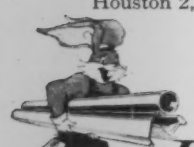

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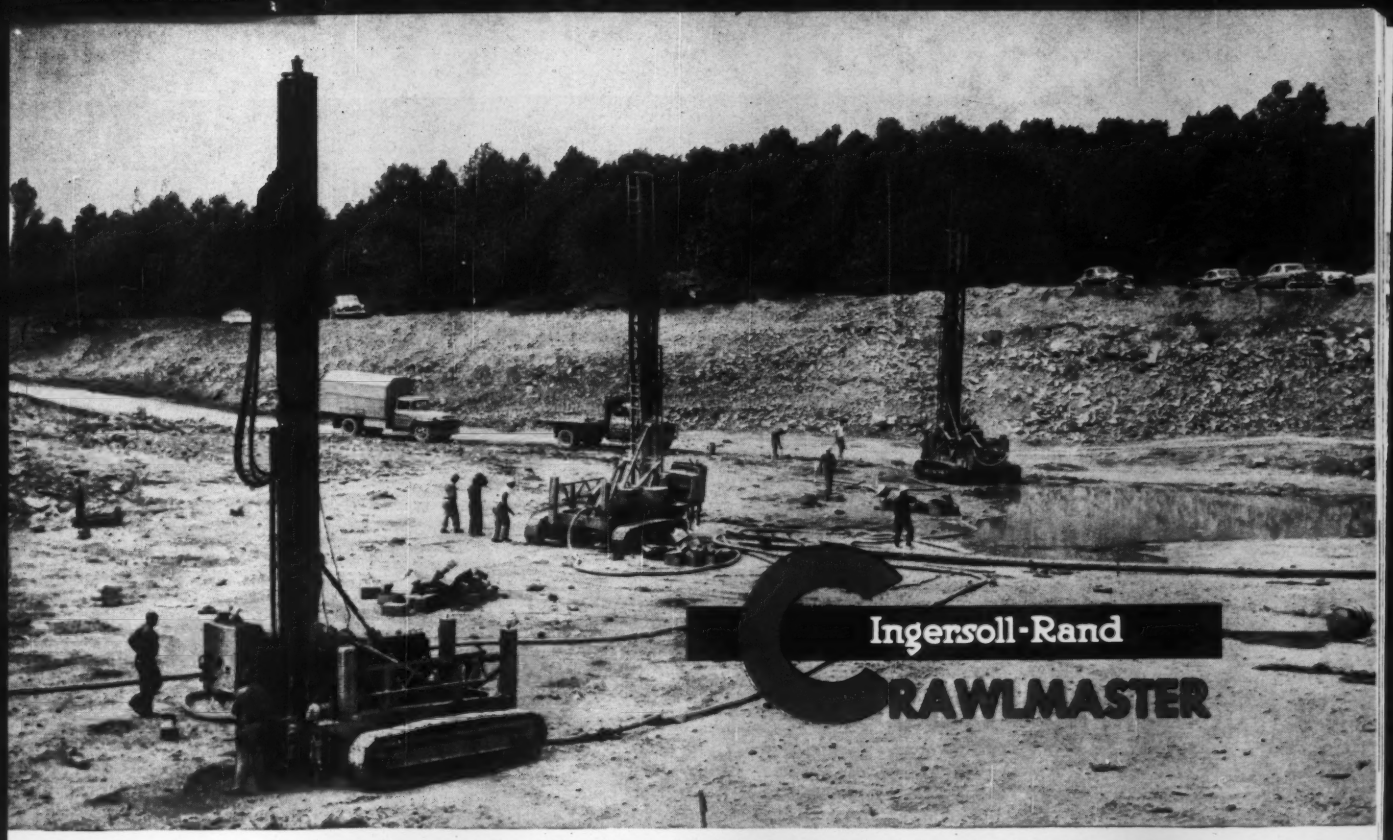

E. J. Petrillo's Yonkers Contracting Co. speeds drilling of 3½ million yard cut at Jugtown Mountain with three Ingersoll-Rand Crawlmasters.

new **SUPER-POWER** crawler drills help move Jugtown Mountain

In one of the largest highway road cuts east of the Mississippi, a 3½ million cubic yard "bite" is being taken out of Jugtown Mountain near Phillipsburg, N. J. The 117-ft deep cut requires removal of a million and a half cubic yards of granite gneiss—and the heavy drilling is being done by three of Ingersoll-Rand's new hydraulic-feed Crawlmaster drills.

Purchased for this job after competitive tests, the Crawlmasters are putting down 4½" holes 18 to 20 ft deep spaced on a 9 x 10 ft grid. Using the new D-525 drifter with 5¼" bore, they easily out-drilled two 5½" bore machines and are heavier and more ruggedly built throughout. Outstanding features include constant-pressure hydraulic feed and retraction, throttle-controlled reverse rotation, hydraulic tower positioning from vertical to horizontal, rugged tractor-type crawlers with enclosed gear drive from two 11½-hp air motors, and four 30" stroke hydraulic leveling jacks. Capable of percussion, rotary or Downhole drilling of 4" to 6½" holes at any angle, the Crawlmaster is the most rugged and versatile machine of its type ever developed.

Supplementary drilling on steep slopes is done by six Crawl-IR drills and all air for the project is provided by one 900-cfm and six 600-cfm Gyro-Flo portable compressors.

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One of the Crawlmasters makes short work of angle-drilling a larger boulder.

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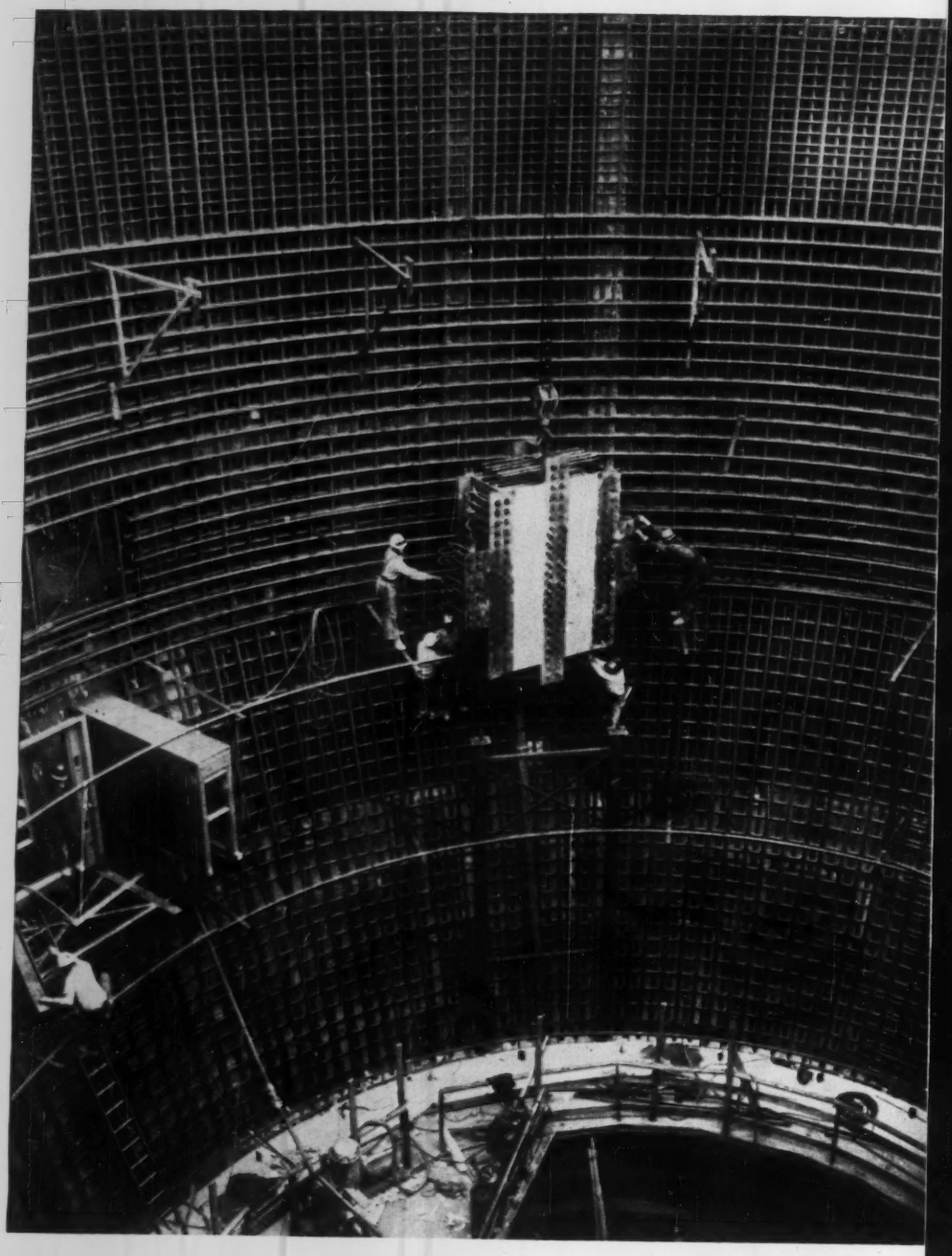
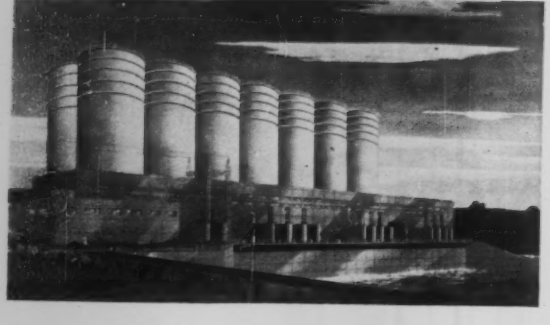


Kansas missile base. Re-bar work for the launch-control centers and huge Atlas silos, like the one at right, has just been completed. Ryerson supplied 12,000 tons of re-bars for the job. And service included fabrication of a large tonnage of #14S and #18S bars.

SUPERVISED BY: U. S. Army Corps of Engineers for the U.S. Air Force.
GENERAL CONTRACTOR: Utah-Manhattan-Sundt.
RE-BAR PLACER: Camblin-Steel Service Co., Inc.



12,000 tons of re-bars for Missouri River dam—The Oahe Dam near Pierre, S.D.—world's largest of the rolled earth type—will have installed power capacity of 595,000 KW and a reservoir 250 miles long. Re-bars, 12,000 tons of them for the Dam's massively reinforced powerhouse superstructure and surge tank bases, are being supplied by Ryerson—and re-bar work is proceeding on schedule.

AGENCY: U.S. Army Corps of Engineers, Omaha District.
GENERAL CONTRACTOR, Powerhouse superstructure and Surge Tank Bases: Atkinson-Ostrander Co., San Francisco.
RE-BAR PLACER: Camblin Steel Service Co., Inc.

SPECIALIZED RYERSON RE-BAR SERVICE SPEEDS PROGRESS ON THESE IMPORTANT JOBS

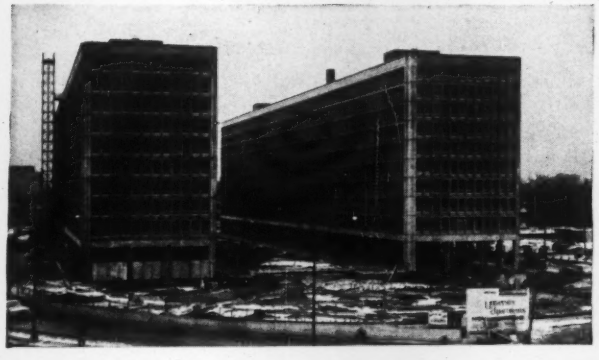
On the most important jobs where supply problems are most complex and where schedule delays would be most costly, more and more contractors rely on Ryerson re-bar service.

Ryerson's unsurpassed capacity is one reason —the nationwide scope of Ryerson service is another. A third reason is the range and flexibility of Ryerson service.

Our experience qualifies us to evaluate the special problems of each job and come up with re-bar service tailored to the particular requirements. For example, to expedite delivery and placement we may assign Ryerson specialists to the job site. Or to make quick schedule changes easy we may fabricate some steel at the site.

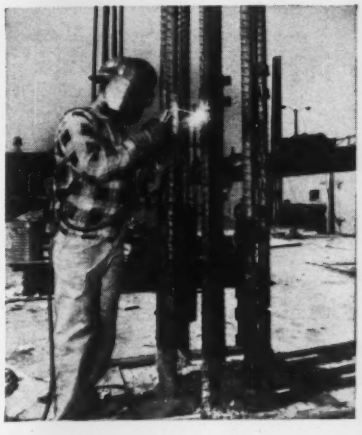
The next time you build with reinforced concrete, look to Ryerson for special reinforcing steel service—tailored to meet your requirements whatever the size or nature of the job.

Alloy Re-Bars save floor space in insurance tower—The Hartford Insurance Group's beautiful new Chicago building contains more than 3,600 tons of Ryerson reinforcing steel —including 600 tons of special alloy re-bars. The added strength of these bars, and the fact that they were welded end to end up through the columns accounted for these reductions in column size at the ground floor level: 15% dimensional reduction; 28% area reduction. Photo below shows welding of alloy bars at the job site.



Ryerson Service speeds urban redevelopment project—Handsome twin buildings at the University Apartments centered on re-routed boulevard, replace run-down dwellings on Chicago's south side. A part of huge Hyde Park redevelopment project sponsored by Webb & Knapp, buildings and garage beneath the central garden area contain about 2,000 tons of Ryerson reinforcing steel.

ASSOCIATED ARCHITECTS: I. M. Pei & Associates; Loewenberg & Loewenberg.
GENERAL CONTRACTORS: Taylor Construction Co., Miami; Webb & Knapp Construction Corp., Chicago—a joint venture.



OWNER: One Hundred South Wacker Drive, Inc., Chicago.
ARCHITECT: Skidmore, Owings & Merrill, Chicago.
GENERAL CONTRACTOR: George A. Fuller Co., Chicago.

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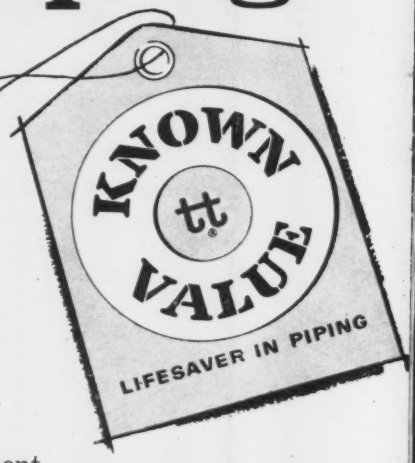

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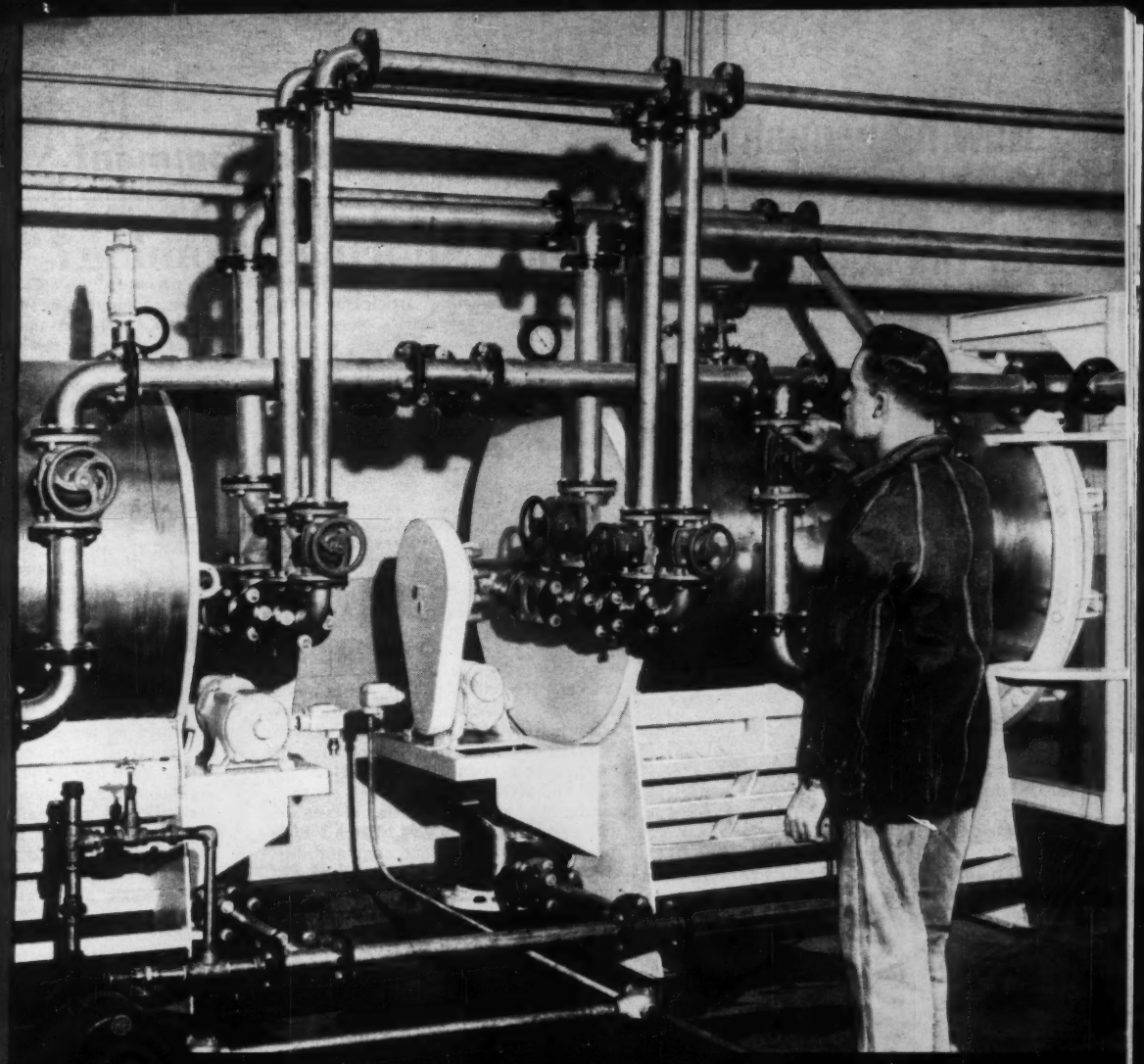
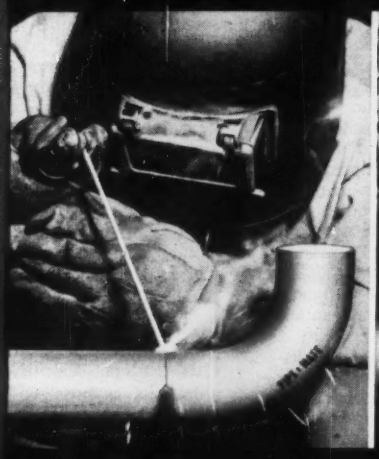


Lightweight stainless steel process piping systems fabricated with PIPE-MATE rolled-in flanged connections cost less to install and save up to 50% in pipe costs, too.



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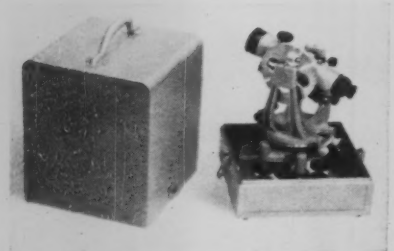

W. & L. E. GURLEY

Union Plaza, Troy, N.Y.

Reader Comment

Labor Shortage Coming?

SIR:—The interesting article in your April 20th issue entitled "Construction Drifts Toward Labor Shortage" reaches its conclusion that there will be a labor shortage largely on the premise that productivity in the construction industry will not increase during the sixties. It says there are three million on-site employees now, that the volume of construction may increase 40% during the decade, and therefore, 4.2 million will be needed for on-site labor in 1970. We are not adding to the construction labor force; therefore, we will not have the needed 4.2 million workers in 1970, ergo—trouble.

This same argument was made ten years ago. At that time, contract construction was reported as employing 2.3 million. The value of work put in place in 1947-1949 dollars was reported as $28 billion, and apprentice training was reported to be woefully inadequate. In 1960, employment was reported up 12% and activity up 32%, on a roughly comparable reporting basis. (Some of the reporting system has changed during the period so exact comparability is not possible). Any unemployment rates among construction trades tended to be higher in 1960 than in 1950. The increase in activity and the lag in construction employment and in apprentice training during the decade did not create a labor shortage by 1960.

The crude figures suggest an increase in productivity of roughly 1¾% per year for construction labor. In some areas, the increase may have been double this. The increase in the sixties should be still greater. Construction industry, like agriculture, has lagged somewhat in its acceptance of modern methods but those methods are now being accepted and the realizable potential for increased productivity now is very great. If output per man increases only 2% per year during the sixties and if construction activity increases 4% per year, which may be a high estimate, the construction industry will need to increase employment only 2% per year. In view of the fact that the experts tell us employment will be one of the major problems of the sixties, it would appear quite possible that the construction industry can find 600,000 more men by 1970 than it found in 1960. It found 500,000 more in 1960 than in 1950 despite a tighter labor supply in the fifties than is anticipated for this decade.

We have been hearing cries of distress for many years about coming shortages in wood, iron, copper, tin, nickle, etc. An input-output study given the Executive Office of the President in 1949 proved, conclusively, that there would not be enough lumber for the volume of building in 1960. Such un-Cassandra forecasts have not come true because changing technology and changing price relationships have provided plenty of most of what the economy has needed. A similar thing is likely to happen in construction labor in the sixties. A surplus of labor generally, plus changing technology, should make it quite possible for labor and management to reach arrangements that will provide an adequate supply of labor through the sixties despite, or possibly in part because of, the anguished cry in your issue on April 20th.

ROBINSON NEWCOMB
Robinson Newcomb Associates
Washington, D. C.

SIR—I just read your April 20 article entitled "Construction Drifts Toward a Labor Shortage."

I am 63 years of age and have had 42 years in the construction field on all types of construction, except tunnels. I have had 30 years of experience as a construction superintendent.

I believe I am qualified to comment upon the lax interest in carpenters' apprentice training. No wonder so many apprentices will drop out of training and struggle along at any work they can secure.

There are many construction firms that do not want to help bear the expense of making good mechanics. They are trying to make a specialist of the many different types of carpenter work. They want one to be good at sub floors, another at roof decks. They want another to do nothing but nail flooring.

They are not willing to place the young man with a good mechanic and have him assist with batter boards, the entire framing, the items mentioned above, the finish work or hanging and locking of doors. The general method of operation is to use one crew for foundations, another for framing and so on through the construction period.

So what happens? The young man does not have steady employment. He learns only one phase of the trade. He becomes discouraged. He is terminated and other young men will go through the same cycle. I have witnessed such in many states.

D. S. WILKERSON
Carpenters Local Union No. 776
Marshall, Texas

(*Reader Comment continued p. 14*)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

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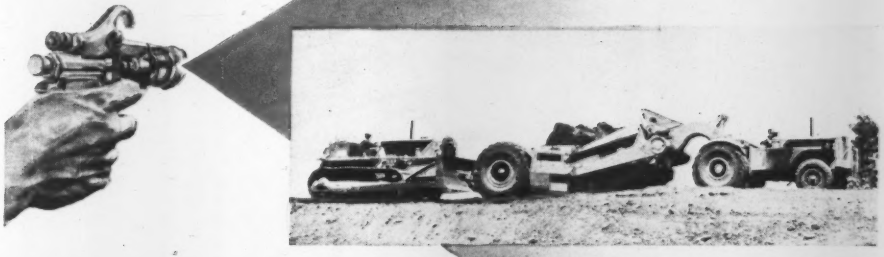

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Easy does it. No bolts, nuts, wrenches. Assembles fast with only a moderate thrust needed to move ball past self-sealing gasket into socket. Retainer ring provides positive lock against pull-out.

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General Office: Birmingham 2, Alabama

A Wholly Integrated Producer from Mines and Blast Furnaces to Finished Pipe.

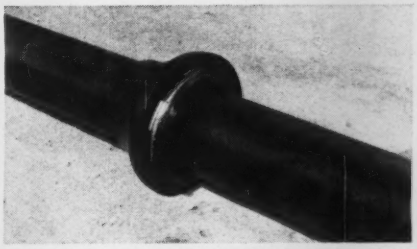
USIFLEX®
BOLTLESS FLEXIBLE JOINT* PIPE

*U. S. Patent No. 2,564,938

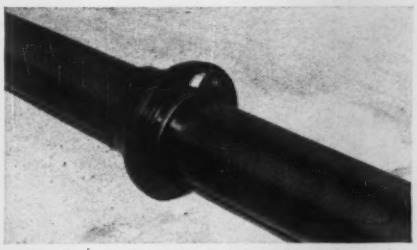
INDUSTRIAL SERVICE CAST IRON®

1 Insert the gasket in its seat in the socket. Forming gasket loop helps initial stage of seating. Release of loop allows gasket to spring into the gasket seat where it is securely held.

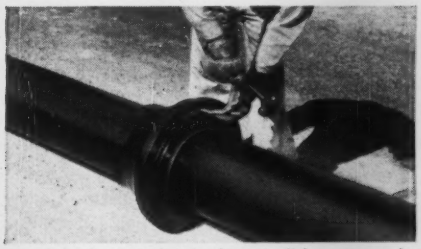
2 Apply special Usiflex lubricant to the ball and inside surface of seated gasket in socket. After lubrication, ball is ready to be pushed into socket.



3 Ball has been socketed. Retainer ring lugs have been lined up with recesses in bell and retainer ring is ready to be moved into the bell and rotated.



4 After insertion and rotation of retainer ring in bell, the lugs on retainer ring are in back of and in register with internal flange segments in bell. Lead lock is partially inserted into recess between the bell and retainer ring.



5 Lead lock completely inserted in recess is being caulked in place by hammer blows on a wide caulking iron.

10,000 Sq. Ft. Under Cover

Corruform steel base provides safe, strong working

Fastest way to a strong, economical concrete floor or roof slab: start with light, rigid Corruform sheets. They're easily carried and quickly placed. Cover up to 24 sq. ft. per sheet. Welded to joists, Corruform provides a safe, strong working platform—trades move in fast. Sheets withstand normal construction traffic because they are made from high-strength tough-temper steel. You get competent service and fast delivery of Corruform to your site from local stocks through experienced distributors located in most major cities.

Before Sundown!

platform—speeds construction

CORRUFORM®

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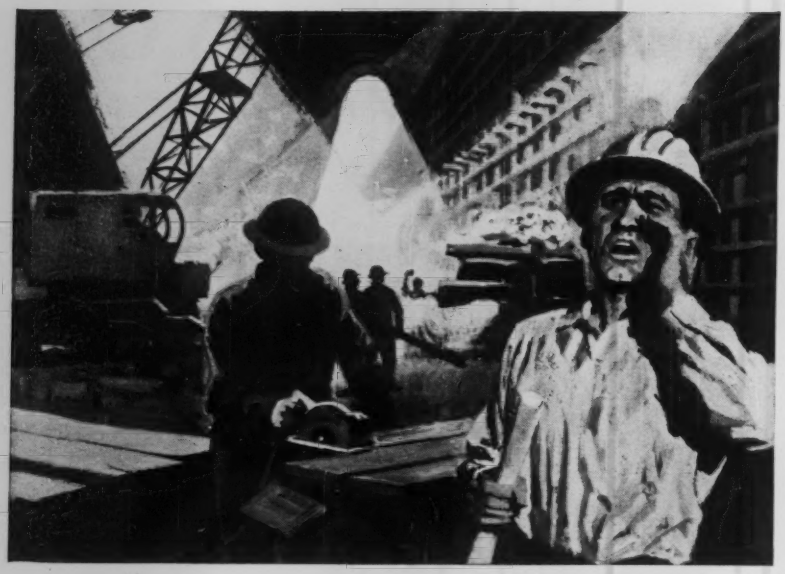
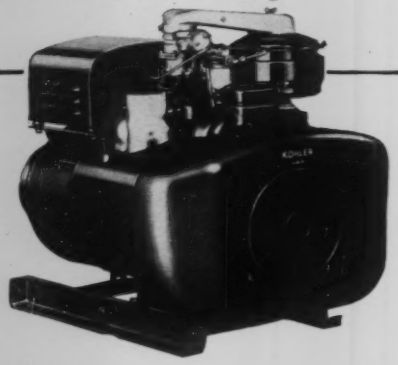
MAIL FOR FREE CORRUFORM MANUAL



KOHLER ELECTRIC PLANTS

Independent power with stamina—cost-saving reliability

On the job at dam, bridge, turnpike, seaway and building construction—major projects of all kinds—Kohler electric plants are staunchly dependable under any conditions... Engineered for rugged, round-the-clock endurance wherever needed for floodlights and power tools, or on cranes and service trucks, they contribute smooth-running efficiency that saves time and money... Quick-starting in all weather, economical to operate, easy to maintain... Sizes to 115 KW, gasoline and Diesel. Write for folder K-39. See us in Sweet's Catalog.



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Established 1873
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MODEL 5RM61, *5000 watts, 115/230 volt A.C. Remote start.*

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ENAMELED IRON AND VITREOUS CHINA PLUMBING FIXTURES • ALL-BRASS FITTINGS
ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION CONTROLS

. . . Reader Comment

Clearing Litani Tunnel

SIR—We read with great interest the article "Stalled Litani Project Studied" (ENR Mar. 30, p. 44) since we are the contractors of the Awali Tunnel Works. We would only call your attention to the fact that it is not LRA which "has been making cautious efforts to clear the sand-filled tunnel" but the contractors themselves under their own and sole responsibility.

This clearing has progressed since January under shelter of watertight safety doors set in place every 250 meters and carried forward as soon as clearing had progressed on the same length. At present, we have advanced 1600 meters from the portal. That means that we have cleared nearly half of the sand-filled tunnel in less than four months, and we do hope the work will continue without any incident.

R. VUELEUR
Technical Director
Societe Auxiliaire D'Entreprises
Paris, France.

Towers

SIR—Concerning the replacement of two lightships with towers (ENR Mar. 30, p. 26) and the fatal accident to the Air Force Texas tower out in the Atlantic Ocean (ENR Feb. 2, p. 22), I suggest that, for all such structures now in existence and contemplated for the future, hitherto unanticipated hazards be evaluated and corrective measures taken to eliminate them for all time.

Hazards not compensated for in existing—and presently contemplated—towers in deep water are:

Collision of an iceberg of a size shallow enough but large enough in area to contact the legs of the structure.

Large areas of drifting ice two to five or more feet thick.

Vessels 100 to 80,000-ton displacement in any weather, anytime, night or day, but mostly in foggy weather. Just slight contact could wreck any of these towers, not forgetting that a large vessel drifting or under way would completely demolish such a tower with but slight chance of rescuing any of the tower's occupants.

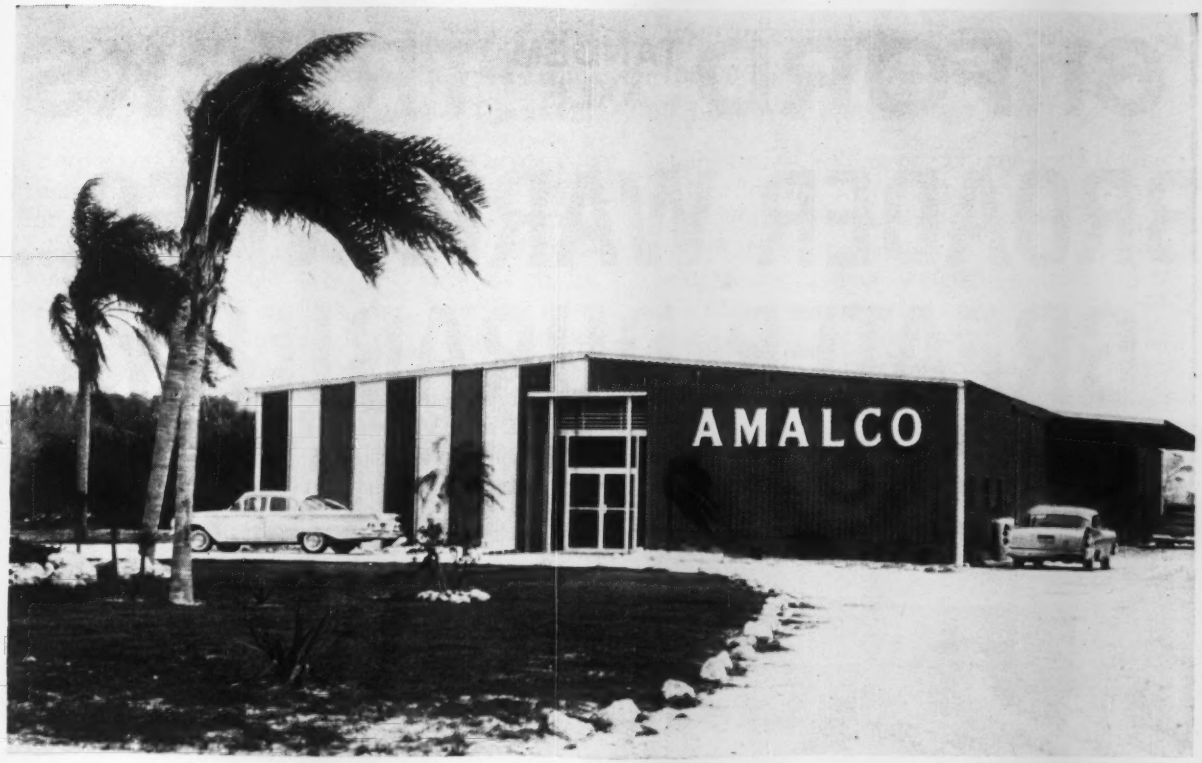
Low-flying aircraft under a low ceiling in hazy weather, unable to veer clear due to air speed.

I suggested taking the following corrective measures:

Immediately after the legs are erected, positioned and braced, start dumping large rock and boulders in and around the legs to build up a complete rock island, leaving the tower legs protruding. Though this rock will take several months to place, it will be possible for contractors' erection vessels to complete the superstructure and to install equipment long before the rock island gets to the water surface.

The rock could be most economically

(*Reader Comment continued p. 24*)



STRAN-STEEL PUTS WORK SPACE IN A SHOWCASE

American Aluminum Company makes a product and meets its public in a single Stran-Steel building! Pre-engineered Stran-Steel gives a maximum of column-free space for fabricating operations, plus plenty of room for attractively panelled salesrooms. The building's modern low-pitched roof is a striking addition to the community, increases its customer appeal, too. And exterior panels—with a choice of 10 colorful Stran-Satin peelproof coatings—will stand up to tropical weathering for years. Easy to buy, dual purpose Stran-Steel buildings can be financed under your Stran-Steel contractor's low-cost "package deal" plan. Call him today—he's listed in the Yellow Pages under *STEEL BUILDINGS* or *BUILDINGS, STEEL.*

STRAN-STEEL
Buildings for Modern Business

American Aluminum Company of Bradenton, Florida, fabricates storm windows, doors and carports in a modern, attractive LR 60′ x 194′ Stran-Steel building, shown at top in Stran-Satin Blue.

CLIP COUPON AND MAIL TO STRAN-STEEL CORPORATION, DEPT. ENR-20, DETROIT 29, MICHIGAN

Please send complete literature on Stran-Steel Buildings in Stran-Satin Color. I'm interested in a building approximately_____ ft. by _____ ft. to be used for_____

Name_____ Title_____
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'61 FORD TANDEM AXLE TRUCKS

BROADER WARRANTIES... GREATER DURABILITY... BIGGER CHOICE!

FORD DIVISION, *Ford Motor Company*,

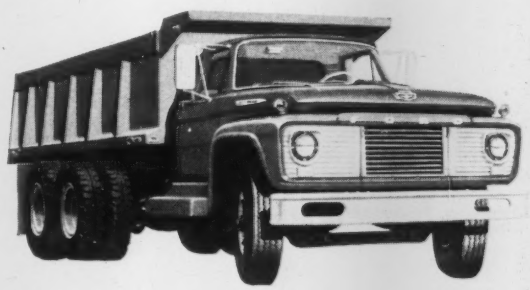
FORD HAS WARRANTED TO ITS DEALERS, WHO IN TURN WARRANT TO YOU:

- **New Super Duty V-8 Engines for 100,000 miles or 24 months!**
- **New Ford Trucks for 12,000 miles or 12 months!**

Ford's rigid quality control program gives you unsurpassed dependability! Positive evidence of uniformly high production and inspection standards is the exclusive new 100,000-mile engine warranty. On 401-, 477- and 534-cu. in. Super Duty V-8 engines, each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. Warranty covers the full cost of replacement parts . . . full labor costs for the first year or 50,000 miles, sliding percentage scale thereafter.

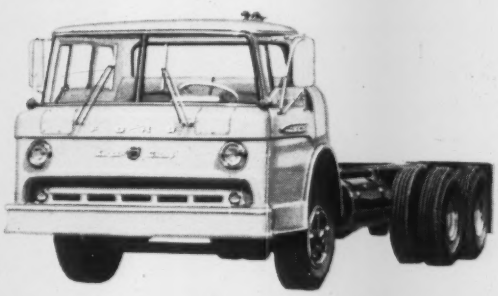
In addition, an extended warranty covers all 1961 Ford Trucks of any size. Each part, except tires and tubes, is now warranted by your dealer against defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement as normal maintenance of such items as filters, spark plugs and ignition points. *No other trucks give you such protection for your investment; never before could you be so confident of long-range durability!*

Tougher tandems offer greater strength in chassis, cab and sheet metal for longer life. Full-Torque flywheel power take-off is available for more efficient drive of transit mixers and heavy-duty equipment.



Timken or Eaton rear axles, with capacities up to 38,000 lb., are available in all Super Duty tandems. High capacity front axles have wider track for increased stability when cornering or in rough terrain.

GVW's up to 51,000 pounds permit big, profitable payloads. Heavier gauge metal and stress-isolating independent mounting for radiator, fenders and cab give you greater durability.



Tandem Axle models are available with tilt cabs. As with conventional tandems, aluminum walking beams, wheels and fuel tanks are offered to cut weight . . . increase payload capacity.

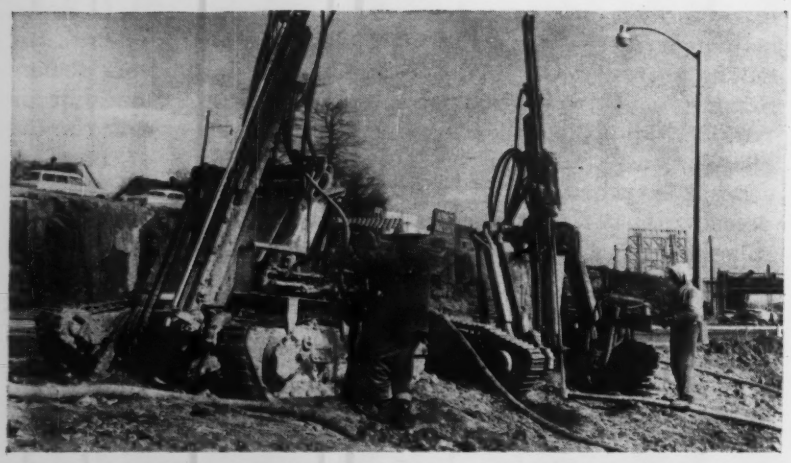
QUALITY-BUILT... MAINTENANCE-ENGINEERED

FORD TRUCKS COST LESS

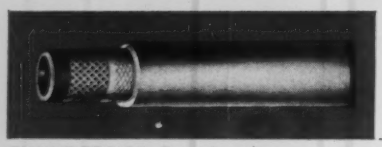
Keep jobs moving with THERMOID Big T Hose!

Whether you're drilling in an excavation or moving a mountain, your Thermoid Big T distributor has a complete line of hose for any construction job. Immediate delivery from stock holds downtime to a minimum. Call your Thermoid Big T distributor today!

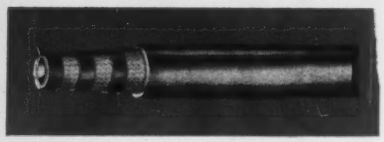
He also carries a complete line of V-belts, automotive hydraulic brake parts and fluid, brake shoes, fan belts and hose. Write: Thermoid Division, 200 Whitehead Road, Trenton 6, N. J., or telephone JUniper 7-3000.



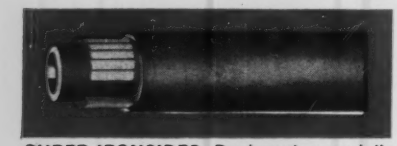
AIR HOSE to run everything from a tamper to a 6" rock drill



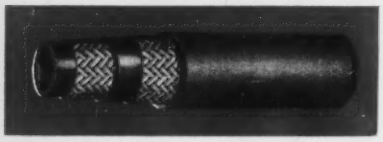
THUNDERBIRD. Tops for economy, durability and safety. For use with heavy air drills and pneumatic tools in the construction field. In 10 sizes from ⅜" to 4". Wire braid construction for high burst strength. Bright yellow cover for easy identification.



THERMINE. Built for rough jobs. Sturdy braids of high-tensile rayon, bonded by tight gripping friction, produces hose that won't twist or kink under pressure. In 8 sizes from ⅜" to 2". Working pressures to 360 p.s.i. Green neoprene cover.

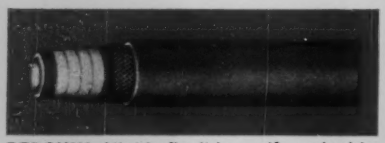


SUPER IRONSIDES. Designed especially for wagon drills and other heavy-duty air drills. All neoprene tube will not swell or flake under hot or oily conditions. In 11 sizes from ½" to 3". Has tough, red neoprene cover. Two plies braided steel wire for high burst resistance.

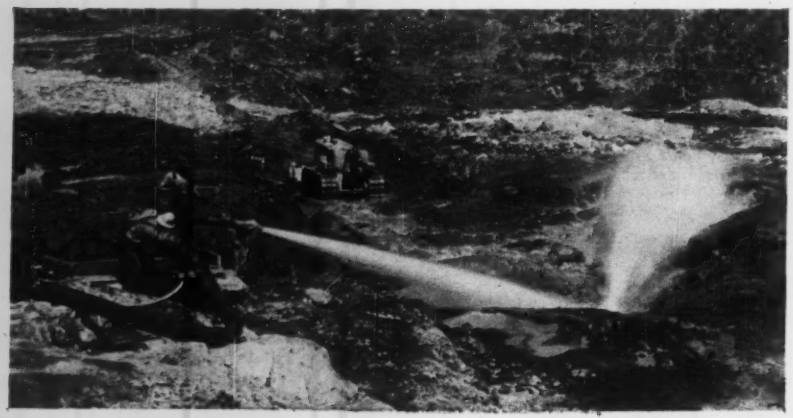


VERSICON. Most versatile hose made. Particularly for air-operated tools. Tube will not chip. High strength rayon reinforcement for highest pressure requirements. Red neoprene cover. Use with water, oil, grease, solvents or sprays. In 22 sizes from 3/16" to 1½".

ROADBUILDERS' HOSE handles water in any quantity

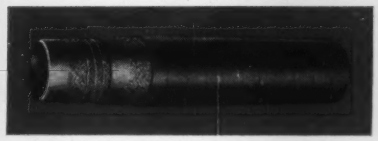


REDSKIN. Highly flexible, uniform inside diameter for full flow of water. Ideal for heavy-duty construction and road building use. Highly resistant to weathering and abrasion. Lengths to 50'. Sizes 1"-2". Maximum water pressures to 175 lbs.

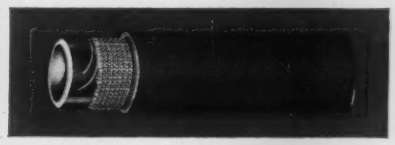


HOSE FOR SUCTION AND DISCHARGE to pump any kind of slurry

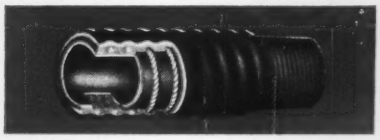
CONTRACTORS Smooth Bore. For suction use in sewer, foundation, trench and road construction. Constructed with plies of heavy duck and steel wire. Compounded to resist water containing alkalies and acids. Lengths to 50′. Sizes to 12″.



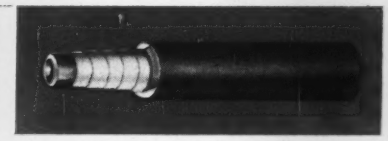
REVOLC. Light flexible suction hose. Easy to handle, yet rugged. Smooth rubber to insure maximum flow. Wire reinforced, horizontally braided. Resists kinking or crushing. Yet easily cut to any length. Lengths to 50′ in sizes from 1¼″ to 4″.



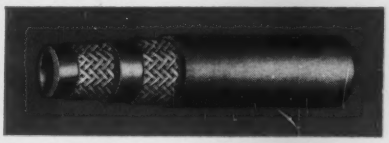
VICTOR CL. General purpose hose, heavy-duty suction or discharge service, up to 100 lbs. pressure. Withstands full vacuum and direct connection to centrifugal and piston pumps. Sizes: 1¼″ to 1½″ with molded cover; 2″ to 4″ with wrapped cover.



THERMOCORD. Especially adaptable for service where hose may be exposed to traffic or other crushing or pinching conditions. Snaps back to permanent shape when weight is removed. Sizes 1½″-3″.

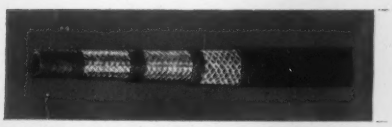


HERCULES. General discharge service at medium pressures in industry and general construction. Particularly suitable on centrifugal and diaphragm pumps. Lengths to 50′, sizes to 12″.

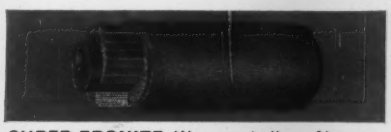


AQUAIR. A dependable, general purpose molded-type hose for medium to heavy duty use. Very flexible and easy to handle. Available in specified lengths or 500′ reels ¼″-1″, 250′ reels 1¼″-1½″.

PILE DRIVER HOSE resists heat and oil



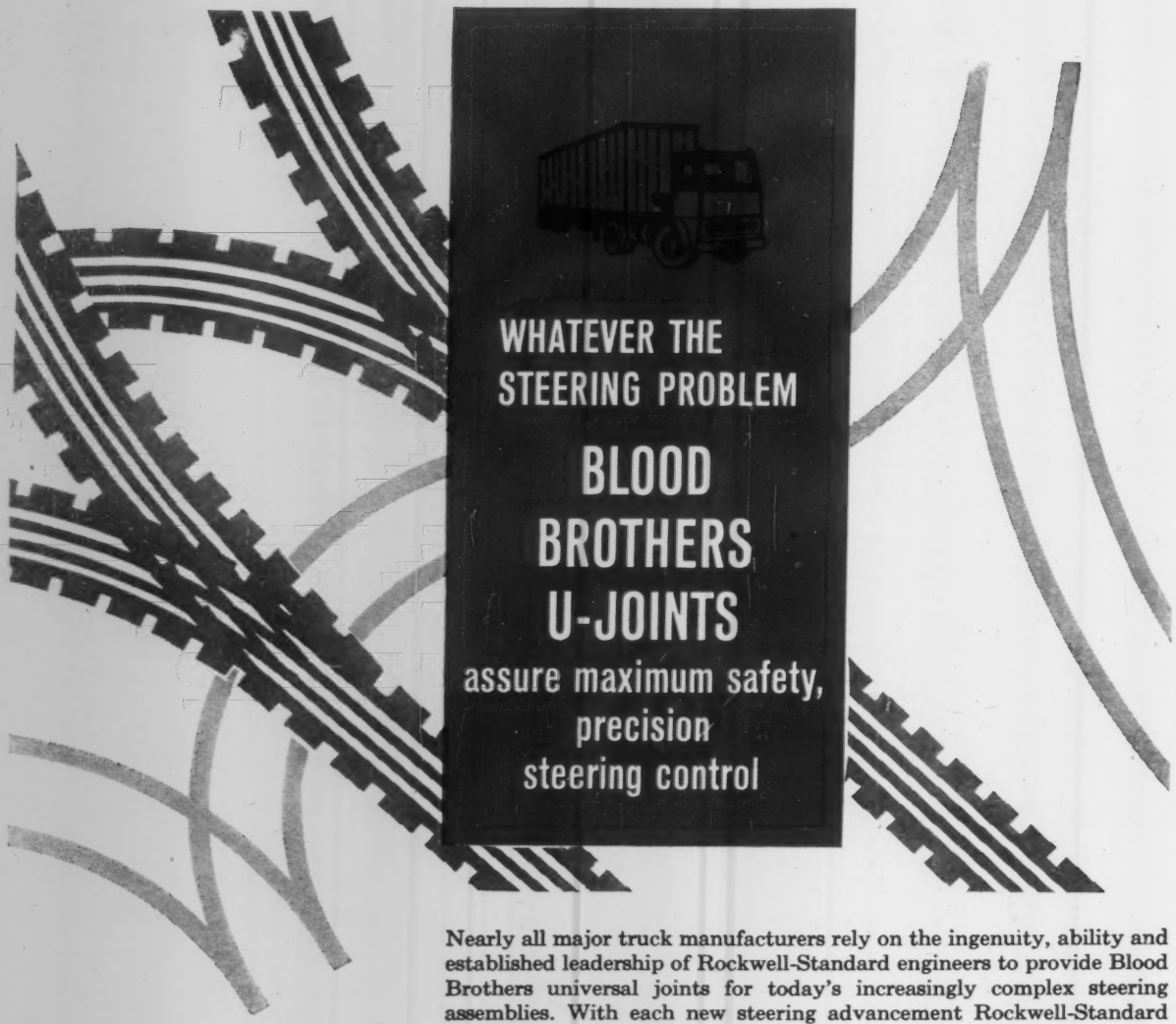
SUPER-IRONSIDES. Wire braided for strength. Operated with maximum working pressures to 200 psi. Designed to withstand effects of heat, pressure, pulsation and introduction of oil from jack hammers. In sizes, ½″ to 3″.



SUPER-EBONITE. Wrapped plies of heavy duck. Operates at working pressures of 150 lbs. Designed to resist effect of heat, pressure, pulsation and introduction of oil from jack hammers. Sizes, ½″-2½″.

THERMOID DIVISION PORTER H. K. PORTER COMPANY, INC.

200 WHITEHEAD ROAD, TRENTON 6, NEW JERSEY



WHATEVER THE STEERING PROBLEM

BLOOD BROTHERS U-JOINTS

assure maximum safety, precision steering control

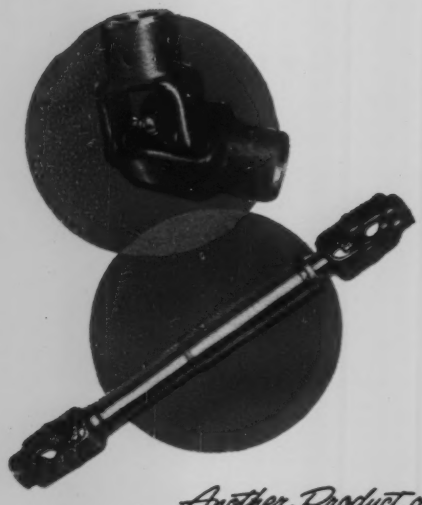
Nearly all major truck manufacturers rely on the ingenuity, ability and established leadership of Rockwell-Standard engineers to provide Blood Brothers universal joints for today's increasingly complex steering assemblies. With each new steering advancement Rockwell-Standard engineers have demonstrated their resourcefulness and skill by supplying dependable, trouble-free universal joints.

For example, the development of power steering and tilt cab trucks introduced the need for more intricate steering shaft assemblies. Rockwell-Standard engineers met the challenge with universal joints capable of transmitting power around corners without any sacrifice in operating performance or steering safety.

PARTICULARLY IMPORTANT IS THE ROCKWELL-STANDARD DEVELOPMENT OF:

- **An anti-backlash universal joint for steering columns that provides greater precision in steering control.**
- **A specially designed machine that tests every Blood Brothers steering joint at 4000-inch pounds of torque. This pre-shipment precaution insures dependable steering that cannot fail even under extreme torque pressure.**

Whatever the steering assembly, whatever problems it presents, Rockwell-Standard engineers can design and develop universal joints that are reliable, efficient and economical.

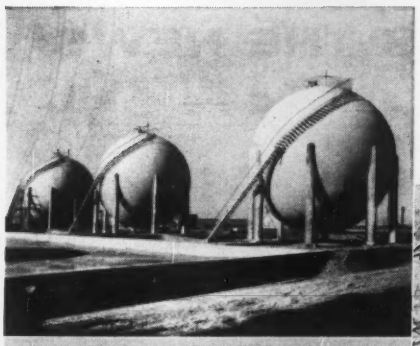


Another Product of...

ROCKWELL-STANDARD
CORPORATION

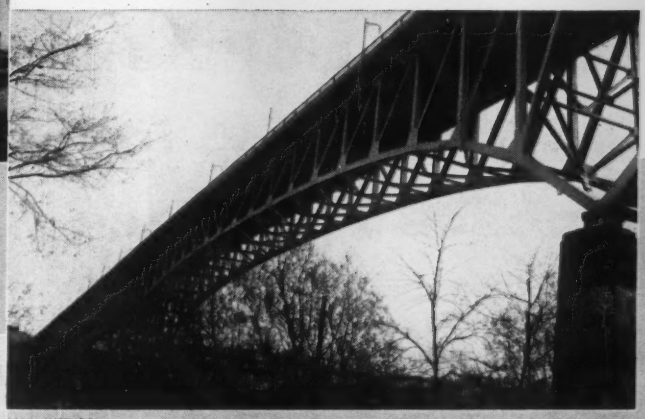
ROCKWELL R STANDARD

Universal Joint Division, Allegan, Michigan



Surfaces like these protected against rust with

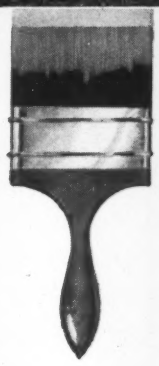
ALL THREE COATS



with

EAGLE-PICHER PERMOX®

1-4-3 (one-for-three)



Permox 1-4-3 is an unusually effective anti-corrosive paint pigment. Using it as the basis for all three paint coats—primer, intermediate and finish—surfaces such as bridges, storage tanks and farm implements, exposed to severe weather conditions, are provided with *cumulative* protection against rust.

Paints made with Permox 1-4-3 are easily tinted and have excellent chalk resistance. These qualities make possible the production of durable, rust inhibitive maintenance paints and enamels in an almost unlimited assortment of contrasting colors and with superior tint retention.

Suggested formulations are available for a wide variety of these anti-corrosive and decorative paints designed for specific needs. We welcome inquiries and are prompt to respond.

Permox 1-4-3 Conforms to ASTM Specification D-1648

Since 1843

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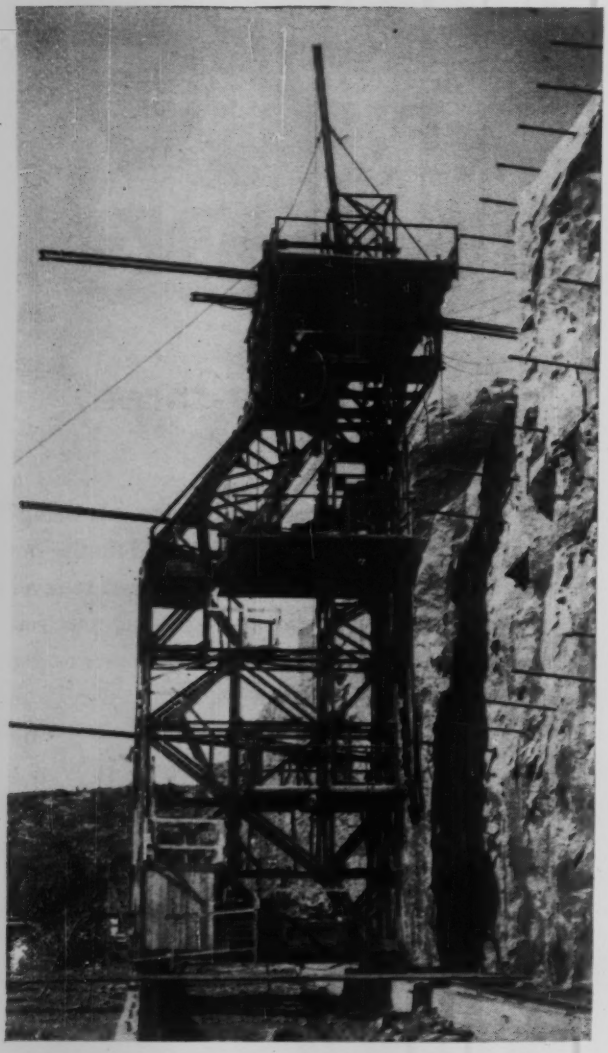
GARDNER-DENVER MAKES THE NEWS

at Port Cartier

Drill specialists provide the answer when 15-foot irregularity poses rock face problem



Irregular rock face on 75-foot-deep harbor wall excavation posed drill bit collaring problem at Port Cartier. In some places hole had to be spotted up to 15 feet away from drill tower. Contractor called in Gardner-Denver for consultation, which led to answer.

The Job: Drilling 1000 four-inch-diameter, deep anchor bolt holes in 75-foot-high rock wall to support steel sheet piling for harbor loading dock.

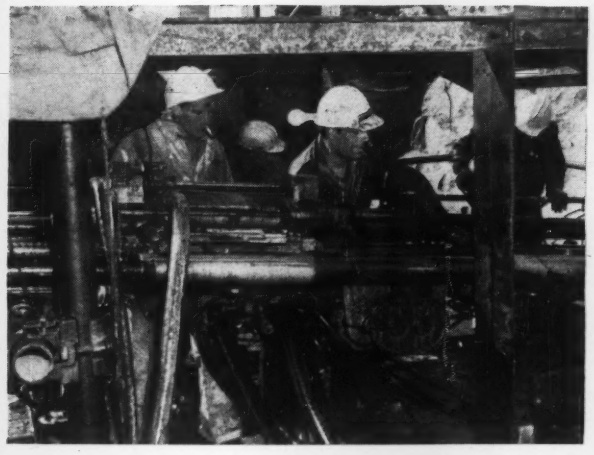
The Contractor: Foundation Co. of Canada.

The Problem: Varying distances between drill tower and rock face made exact collaring of drill bits almost impossible.

The Solution: Gardner-Denver Drill Specialists developed made-to-measure "extendible centralizers" for use with Gardner-Denver PR123 power-rotation rock drills. The extendible centralizer—two parallel tubular bars with universal clamps and a sliding bridge—holds the drill bit firmly in place, eliminates excessive vibration.

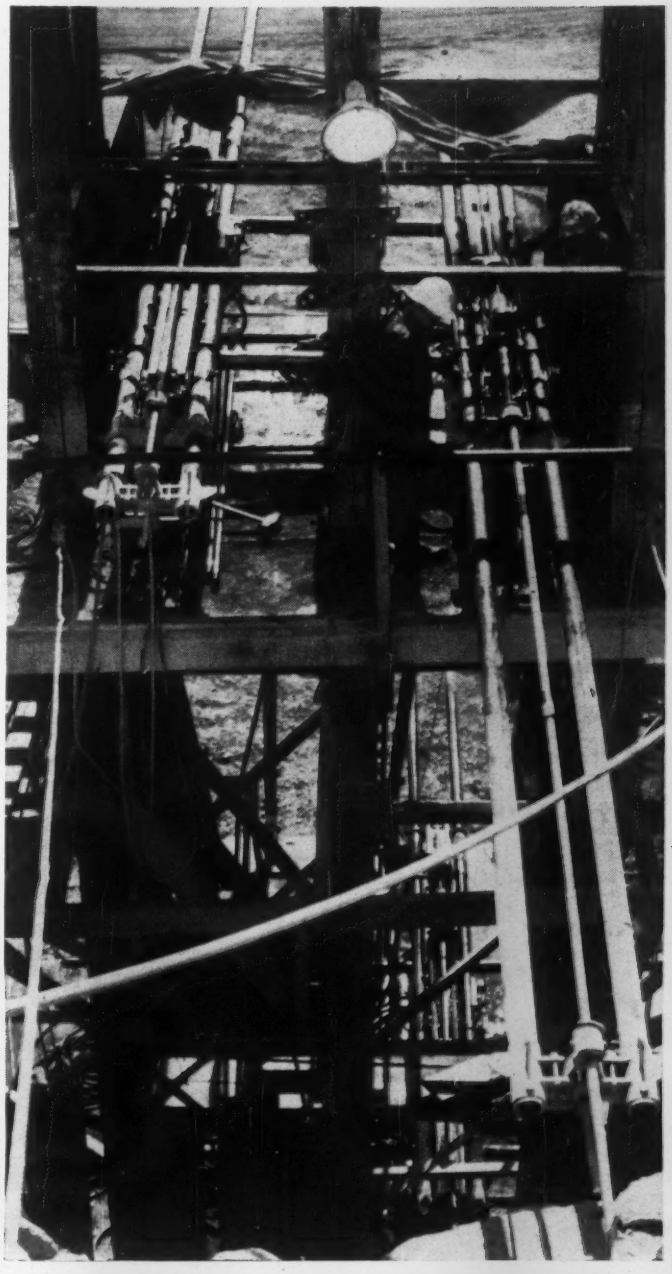
This is another way Gardner-Denver experience and knowledge of equipment application help contractors on the job—with top-quality construction products designed to fit the work to be done.

GARDNER-DENVER Since 1859



Gardner-Denver Drill Specialists worked with the contractor, Foundation Co. of Canada, to develop an entirely new attachment—the extendible centralizer—for use with Gardner-Denver PR123 power-rotation rock drills.

Gardner-Denver Drill units with extendible centralizers proved out perfectly. Attachment holds bit firmly in position, eliminates slipping or breaking of drill shank from excessive vibration. Top platform of tower carries two drills, and middle and lower platforms carry one each.



Problem solved through contractor-company co-operation, drilling progresses as Gardner-Denver PR123 rock drills help speed the pace. Gardner-Denver equipment and experience help contractors solve construction problems anywhere, any time.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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placed by large bottom-dump scows until it is near the surface, after that placement of the rock would best be made with tongs or nets from a long-boom crane mounted on a barge.

The horizontal area of this rock island should be built up at least 10 or 12 ft. above the high-tide line to a top diameter about one and one-half to two times the diameter of the tower.

The natural slope of the rock and boulders of this island will form a beach so that any iceberg or vessel will ground on the rocks before hitting the tower or its superstructure.

The cost of this safety measure will vary with the depth of water and the size of tower. The lightship replacement towers described in ENR will require about 150,000 cu yd of rock at about $6.50 per cu yd in place or a total of about $975,000.

LAURIE R. WALLACE
Miami, Fla.

Another Chorus of Boston Blues

SIR—Your editorial Boston's Blues (ENR Apr. 20, p. 108) is correct in saying that Boston is having problems with both its Prudential Center and its tollroad; but the underlying facts are somewhat different from those which you suggest.

To say, for instance, that the fates of these two projects are "intertwined legally and financially" is not really correct. The president of Prudential has firmly stated that his company takes no position as to the question of a free highway or a tollroad providing access to the Center. He stated further that the only agreements—contractual or otherwise—between Prudential and the Turnpike Authority involve an easement through the planned Center. This, he said, can be re-assigned by the Turnpike Authority without the necessity of involving Prudential—financially or legally. (In fact, the state can take this easement by eminent domain without any legal or financial difficulty.)

It would seem that in fact the delay in building a road to the west of Boston should be laid at the door of the Massachusetts Turnpike Authority itself. They have had the legal authority to construct their Boston extension for over five years. The Authority was originally given this power, because officials maintained that the tollroad could be planned, financed, and built more quickly than a free highway. Yet, in five long years the Authority has not financed or started construction of this extension.

Let us further point out that the 1948 Master Highway Plan, reports of the Boston City Planning Board and the Seminar Research Bureau of Boston College, and the Interstate Highway Program all clearly indicate the need of an expressway from the west to the proposed Inner Belt—but not a road which will extend into the core of Boston, as the proposed tollroad extension would. Thus, the tollroad extension is not in conformance with any of our major highway planning studies. To suggest that highway planners and engineers here in Boston have ". . . dreamed and talked of its turnpike extension . . ." would certainly do violence to the facts of the case.

FREDERICK J. ADAMS
JOHN CLARKESON
EDWARD C. KEANE
A. SCHEFFER LANG
MARTIN WOHL

Editor's Note: Some have dreamed and talked—apparently not these five. As to whether the Prudential project and the road are intertwined: Legally, the Turnpike Authority holds an easement within the area of Prudential's project; financially, Prudential offered to buy a reported $40 million worth of the Authority's bonds.

Twister Proves Value of Code

SIR—Chicago's tornado of March 4 (ENR Mar. 9, p. 32) proves that building laws are valuable not because they are laws, but because there is truth in them.

The Chicago Building Code in Section 68-4.3 of Chapter 68 requires that all roofs shall be designed for outward pressure (15 psf) applied on the entire roof area. A large percentage of the buildings would have been saved from tornado damages or they would have been damaged only slightly if the requirements of Chapter 68 had not been violated.

I examined Chicago's tornado-damaged buildings in the 89th St. area and estimated that the outward pressure on roofs was less than 15 psf. I had no means of estimating the magnitude of inward pressure on vertical walls on the windward sides, but I have evidence that such pressure existed, rather than suction. The extent and pattern of damages indicated that the character and distribution of the wind pressures on these buildings were identical with those observed with common wind storms, as well as with the experimental results obtained at the Auteuil Laboratory in France many years ago.

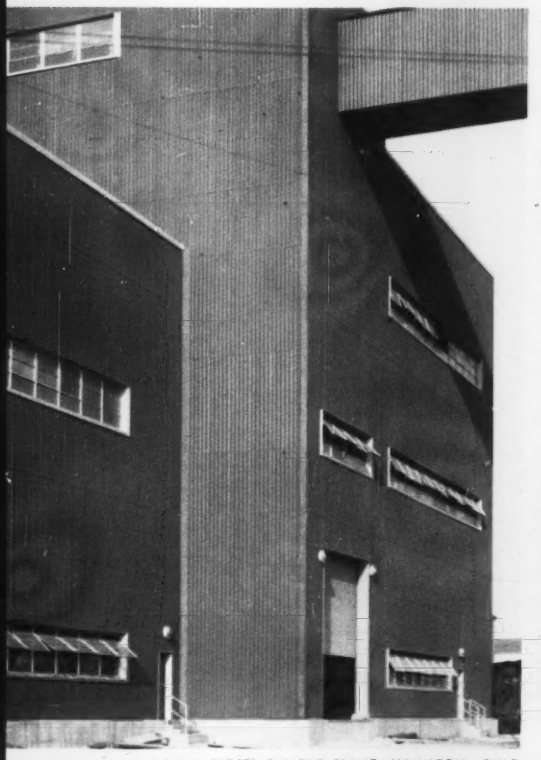
Until study work on the tornado of March 4 is completed by the University of Chicago, I must assume that the tornado center in this area was high above ground and the rotating wind force did not reach one-story and two-story buildings.

My observations refer to the 89th St. area, but the pattern and character of damage was similar also in other areas.

ERNEST KALVE
Chicago, Ill.

(*Reader Comment continued p. 29*)

ANOTHER PRODUCT OF ROBERTSON RESEARCH



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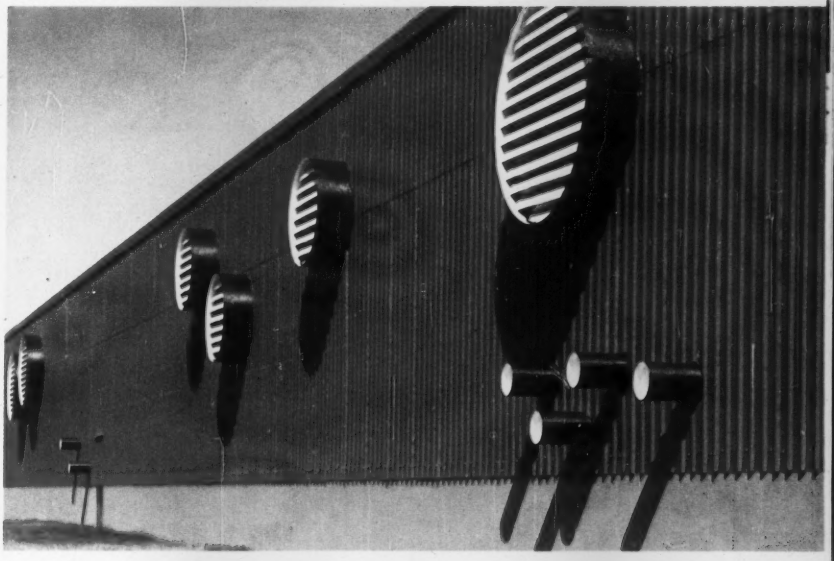
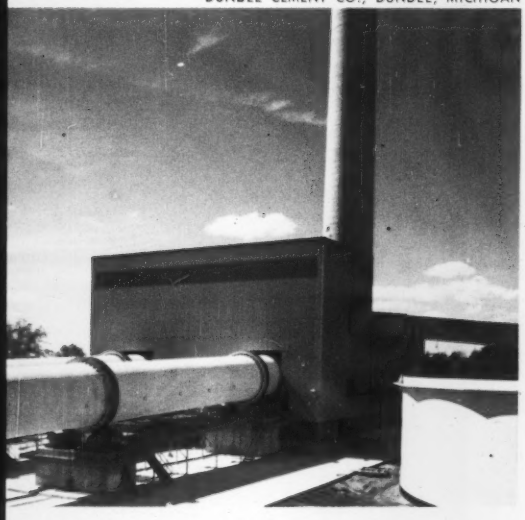


DUNDEE CEMENT CO., DUNDEE, MICHIGAN



It seems altogether fitting that H. H. Robertson Company, who invented protected metal roofing and siding many years ago and developed it into a *long-lasting, maintenance-free product,* should be the only manufacturer to duplicate these benefits in color. Color **GALBESTOS** is basically the same as well-known standard **GALBESTOS.** Asbestos felt is bonded to steel with molten zinc, and then impregnated with asphalt and given an outer waterproof coating. But in the case of Color **GALBESTOS,** the weather coating is a *thick, hot factory-applied layer* of colored synthetic resin developed by Robertson research. Standard colors are RED, BUFF, GRAY, BLUE, LIGHT GREEN and DARK GREEN with the same advantages of long-life and resistance to fire, corrosion and weather characteristic of the familiar black and maroon **GALBESTOS.** Use the coupon to write for literature and photograph book in full color.

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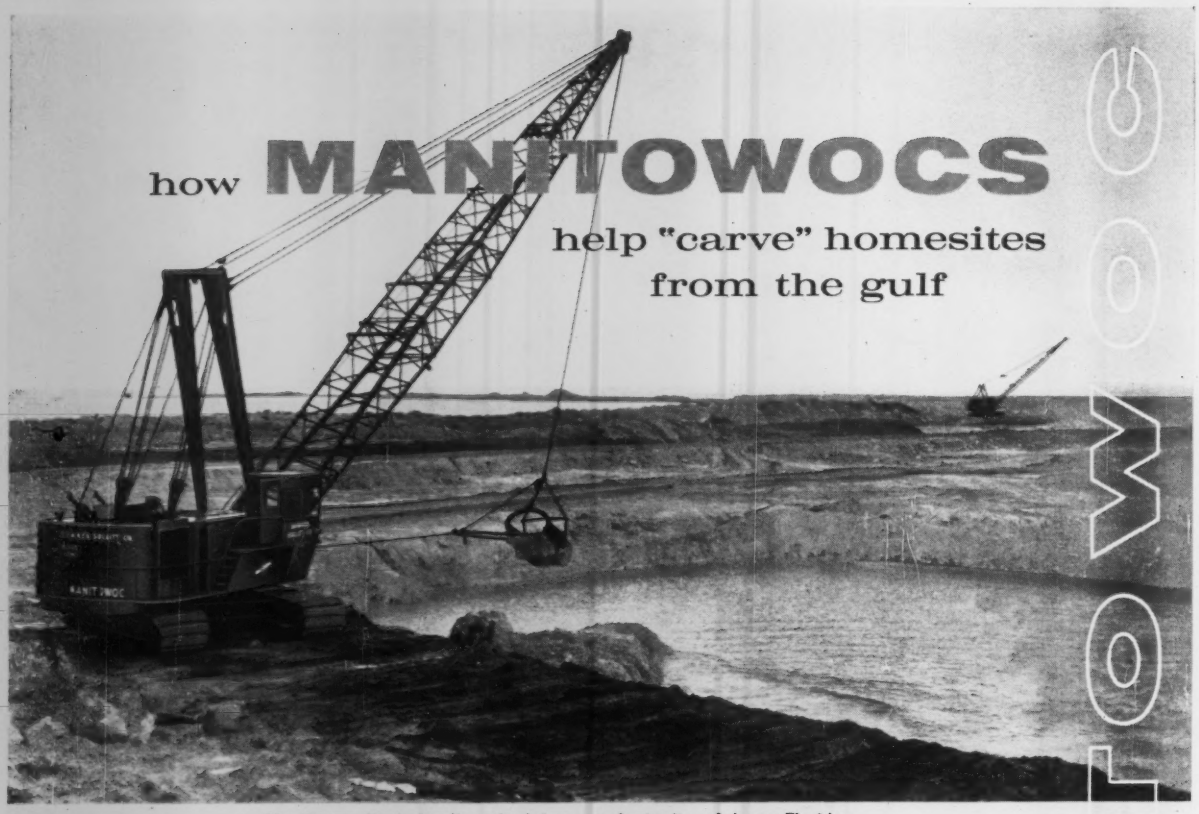
how MANITOWOCS help "carve" homesites from the gulf



Manitowoc 5-yd. dragline dredging canal at site of large Florida real estate development. In the background is a 4-yd. Manitowoc.

Acres of land are being moved into the sea on the West coast of Florida for the construction of a huge new real estate development. Contractor for the massive reclamation job — over 3200 acres are involved, 75% to be built into the Gulf of Mexico — is the Sumner Sollitt Co. of Chicago, under contract to the Flor-A-Mar Development Corp.

In the first step of construction dikes are built 30 feet wide and 15 feet above the high tide level. Two parallel dikes extend straight into the Gulf for about one mile, and half-a-mile apart. A third dike seals off the enclosure except for a sluice through which most of the water drains at low tide. Immediately after draining, the sluice is closed off and the remaining water pumped out.

Among the equipment on the job are a Manitowoc Model 4500 dragline with a 5-yd. bucket and 140 feet of boom, and a Model 3900 using 80 feet of boom with a 4-yd. bucket. Besides being used for dike construction, both machines excavate material for homesites within the dike perimeter and dig canals 100 to 200 feet wide and 10 to 30 feet deep, providing each homesite with navigable water frontage. Canal routes are dynamited from the bottom of the Gulf, which is solid marl and limestone rock in this area. The 5-yd. Manitowoc moves up to 3000 yds. daily of this tough material, despite the hard digging and need for frequent machine moves. Doing identical work, the Manitowoc 3900 has also racked up an impressive output record.

On any size job a Manitowoc can produce outstanding yardage for *you*. A call to your distributor will bring full details on the complete line of Manitowoc excavators, cranes, and truck cranes.

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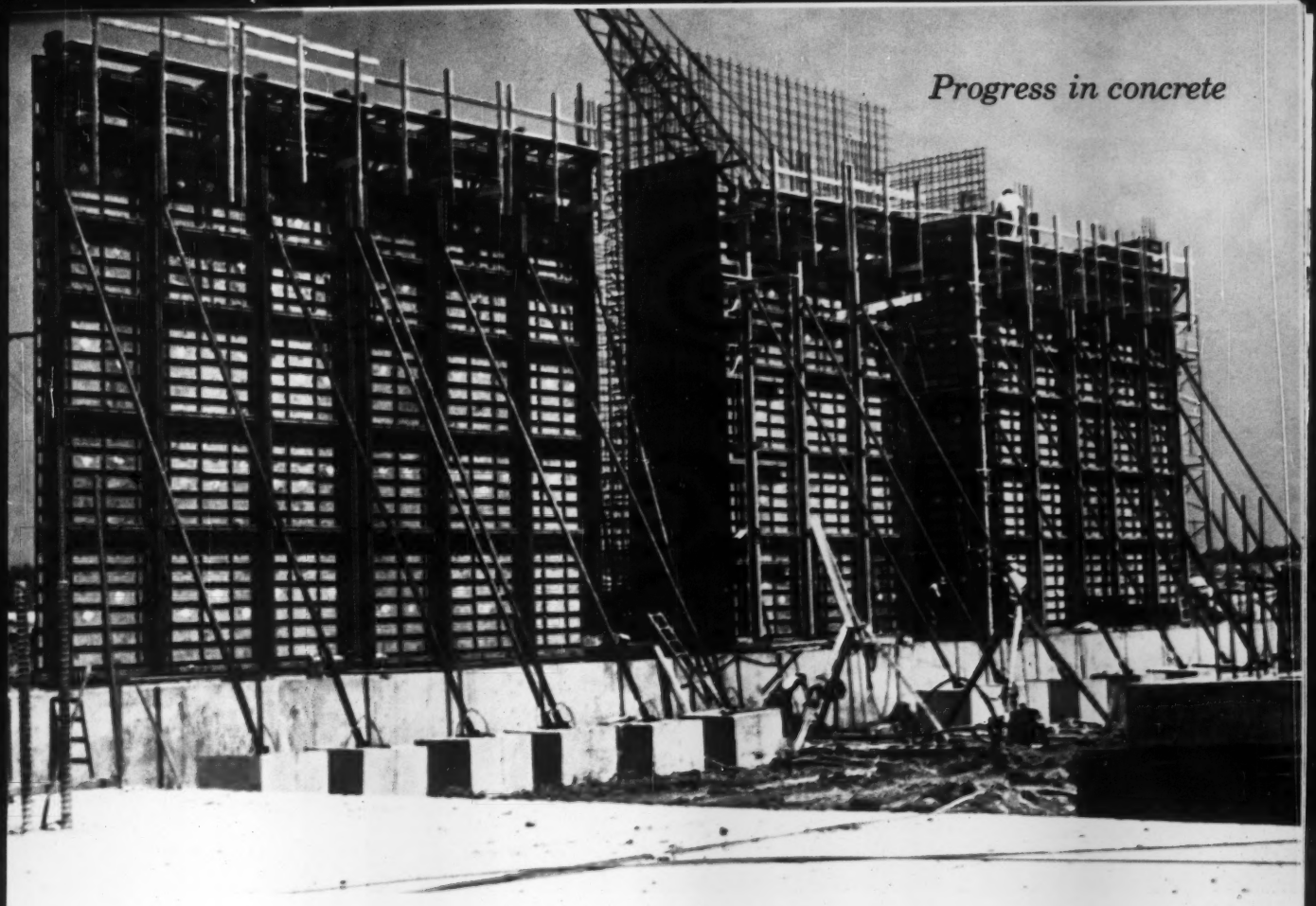
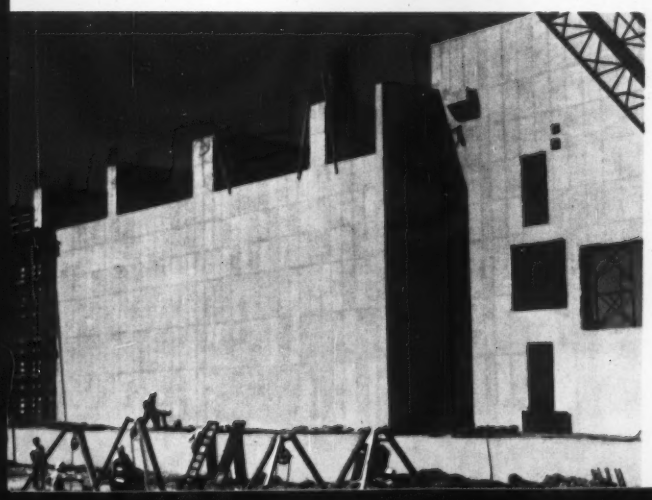


80,000 Cubic Yards of Concrete . . .

Symons Steel-Ply Forms Ganged 20′ Wide, 32′ High

Symons Engineering Service and low-cost form performance on previous jobs were the main reasons Fruin-Colnon Construction Co., St. Louis, Missouri, used Symons Steel-Ply Forms almost exclusively on their multi-million-dollar Lehigh Portland Cement Co. cement mill contract at Mitchell, Indiana.

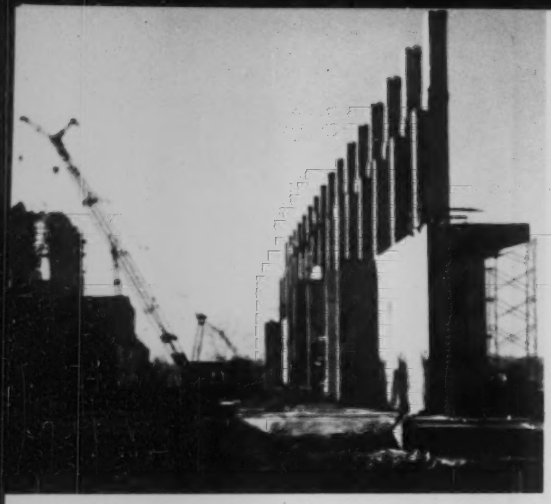
Close work with the Symons Engineering Department and frequent visits to the job by Symons representatives resulted in a substantial savings in time, labor and cost of materials. Also important was Symons ability to anticipate job requirements, thus avoiding unnecessary delays.



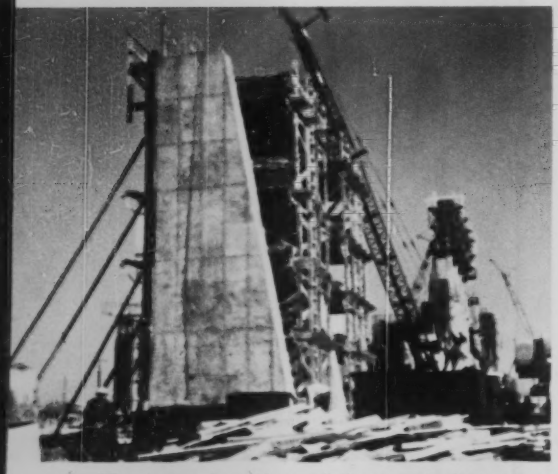
Concrete Construction 99′ High Overall

On the top of the footing mat—some 23 feet below ground level—contractor Fruin-Colnon started work by pouring a series of 78 column bases. Each of these bases measured about 27 ft long, 3 ft thick, tapering upward to a height of 23 ft and a length of 11 ft 10 inches. On top of these bases was then poured 78 heavy counterforts in the shape of large right-angle triangles, the long side of each triangle forming the inside wall of the column. From the 23 ft height above the base, the column then was continued upward another 23 ft, tapering again at that height to a length of 5 ft 10 inches; then continued upward again in a rectangular section of that length to its full final height of 99 ft. The tapered section of the counterforts were formed by using Symons Steel-Ply Forms in stepped-up heights, backing them with 6 inch steel channel strongbacks.

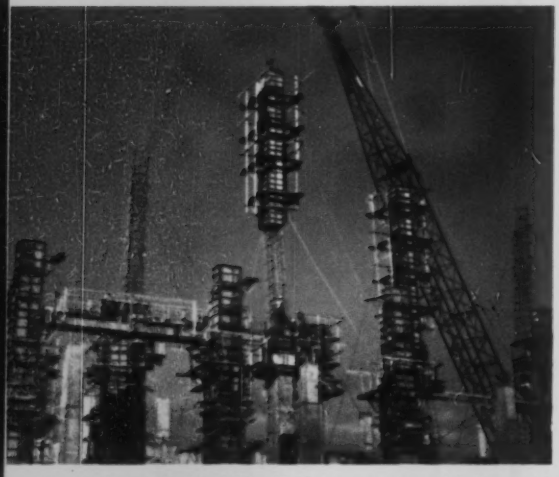
(*Please turn page*)



The straight columns in the center of the building are a uniform 11 ft 10 inches wide, 3 ft thick from the footing to the insets at the top.



The tapered sections of the counterforts were formed by using Symons Steel-Ply Forms in stepped up heights, backed with 6 inch steel channel strongbacks.



Symons Steel-Ply Forms were assembled on the ground and lifted by crane, then lowered over the steel reinforcing rods.

Forming 80,000 cu. yds. (contd.)

32 Foot High Walls

Next step was to connect these huge columns with sections of reinforced concrete wall, 32 ft high, 24 ft in span between columns (center to center) and 22 inches thick.

These were formed by ganging standard panels, connected by standard hardware. They were then reinforced, at 6 ft intervals, by strongbacks.

These big sections were built lying face-down on the ground and then lifted by cranes. Work scaffolds were also placed on the sections during construction.

Cast Concrete Blocks

To support the big ganged forms, Fruin-Colnon used six-inch pipe braces hinged to near the top of the forms on the steel strongbacks. Lower ends of these pipe braces were secured to specially-cast rectangular solid concrete blocks that weighed about 2 tons. Blocks were moved by cranes.

Pre-Fab Work Scaffolds

For stripping and erecting the opposite side of the mainwall, pre-fab work scaffolds were used.

These scaffolds provided a series of four working platforms. With the scaffolds set against the face of the form, workmen could strip and lay the panels flat on the platform at almost any level; then a crane would pick up the whole assembly and move it to wherever it was next needed.

Threading the Needle

Upper sections of the 78 counterforted columns, with their uniform 5 ft 10 inch by 3 ft sections, were cast in assemblies of Symons Steel-Ply Forms, reinforced at about 5 ft intervals with double 2 x 4 walers. Sections were lifted by crane, then lowered over the steel reinforcing rods.

Engineering Service

Symons Engineering Service helped to keep this large job moving at a fast, money saving pace. Symons Steel-Ply Forms can be rented with purchase option.

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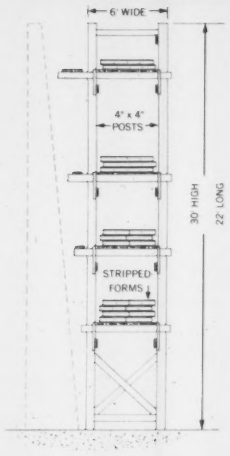
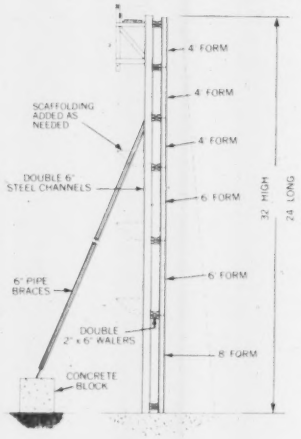
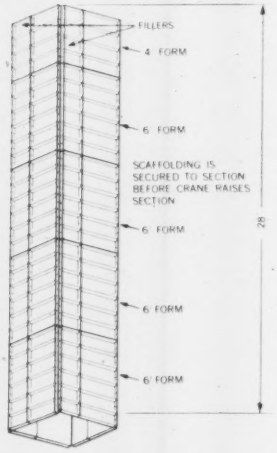


Prefabricated work scaffolds were rectangular in shape, 30 ft high, 22 ft long on the side and 6 ft wide, made up of 4 x 4 wood posts and 2 x 6 stringers and diagonals.



Six-inch pipe braces support the big ganged forms. Lower ends of the pipe braces are secured to specially-cast solid concrete blocks of roughly a cubic yard in size.



Upper sections of the 78 counterforted columns, with their uniform 5 ft 10 inch by 3 ft section were cast in these pre-fab assemblies.

Development on Time

SIR—The implication of your item in the "Business and Finance" section on Charles River Park is unfair as it stands, (ENR Mar. 23, p. 241).

Charles River Park sought, and received, a delay of 60 days on March 1, from the Boston Redevelopment Authority, in the start of construction on the second group of buildings.

Charles River Park's principals sought the delay to enable them to get some leasing experience on the first group of buildings. First leases were signed just last week.

If it is found that the pattern of apartments decided upon for the first group of buildings does not coincide with the market here, then structural changes must be made in the second complex.

Before they can be made, new borings will have to be made. A map of the area in which these borings are to be made must first be obtained from the Boston Redevelopment Authority. Such a request, our experience has been, takes several weeks to get fulfilled.

Contrary to your implication, the first two tower buildings and 18 town houses at Charles River Park will be ready for occupancy this October, 14 months ahead of the deadline imposed by the Authority.

GERALD A. ROGOVIN
Charles River Park, Inc.
One State Street
Boston 10, Mass.

Not Truly Monolithic

SIR—In the article Plastic Plugs Pipeline Cracks (ENR Apr. 6, p. 45), which describes repairs to a "monolithic" pipeline for an irrigation district in California, the type of pipe is not identified. Actually, this is "two-pour" pipe, as it is described in the trade.

We are manufacturers of tamped and vibrated extruded-in-place concrete pipe known by the trade name of "No Joint." Our pipe was not used on this job, but because the article merely referred to "monolithic" pipe we have been embarrassed by statements that it was our product that was involved.

C. T. MCNEILL
No-Joint Concrete Pipe Co.
Yuba City, Calif.

Editor's Note: The pipe referred to in the article is "two-pour" cast-in-place pipe, as Mr. McNeill states.

Rogers, Not Roberts

SIR—I just read the last paragraph of your editorial on MIT's centennial (ENR Apr. 13, p. 200), and invite to your attention the fact that the name of the founder of the Massachusetts Institute of Technology is William Barton Rogers. Ask any geologist.

E. W. RAMSEY
Richmond, Va.

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FOLD up compactly for carrying, storing!

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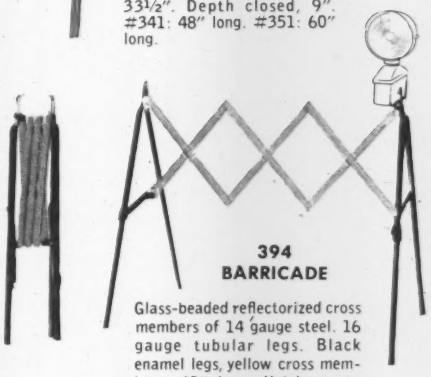
341 and 351 BARRICADES

Sixteen gauge welded steel panels. Spring-loaded channel-iron legs fold into barricade body. Finished in Federal Yellow. Height open, 33½". Depth closed, 9". #341: 48" long. #351: 60" long.

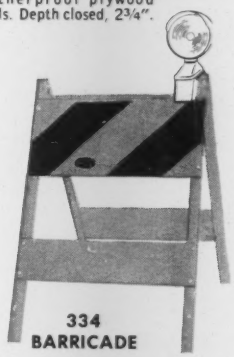
360 & 361 BARRICADES

High-visibility panels with alternating 6" black-and-yellow stripes. Bolted construction. 42" long. Height open, 38⅞". #360: 18 gauge steel panels. Depth closed, 2⅛". #361: ⅜" weatherproof plywood panels. Depth closed, 2¾".



394 BARRICADE

Glass-beaded reflectorized cross members of 14 gauge steel. 16 gauge tubular legs. Black enamel legs, yellow cross members. 48" long. Height open, 35". Depth closed, 2¾".



334 BARRICADE

High-visibility top panels with alternating 6" black-and-yellow stripes. Narrow bottom panel is yellow. ⅜" weatherproof plywood panels are bolted to steel angle legs. 24" long. Height open, 38⅞". Depth closed, 2¾".

ALUMINUM BARRICADE WARNING SIGNS

Eye-compelling "Scotchlite" reflective emblem, red lettering on white background, mounted on sturdy aluminum panels for use on barricades. If barricade is damaged, sign is removable for use on another barrier. Four mounting screws included.

355 & 357 "DANGER" EMBLEM. 355: 5" x 18"; 357: 5" x 30".

356 & 358 "CAUTION" EMBLEM. 356: 5" x 18"; 358: 5" x 30".

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CAUTION

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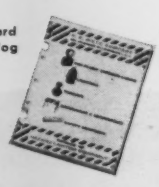
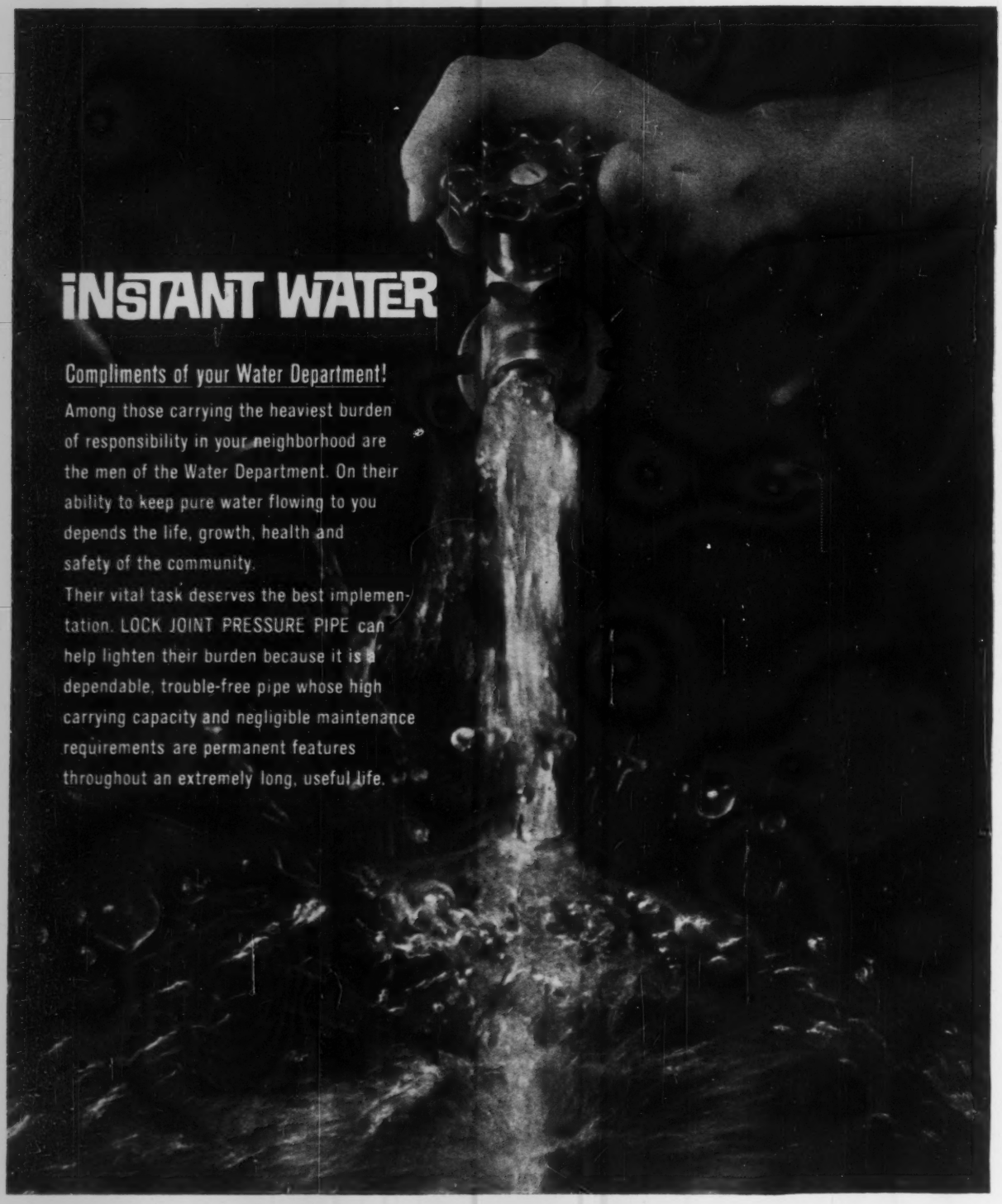
WRITE for complete Hazard Warning Catalog No. 61.



Go DIETZ® and you go Safely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THE CONSTRUCTION WEEK

LOOKING UP—The sharp rise in industrial output last month is one more indication that the recovery is here. Most important effect on you: It will help convince local government, private business and individuals to go ahead with construction plans they've been mulling over.

FINISHED CONCRETE—An amalgam of reinforcing rods, cables, steel forms, an eight-ton concrete finisher, 100 tons of freshly placed concrete and nine construction workers crashed 18 ft to the ground last week in the collapse of a highway overpass near Cleveland. The nine men walked away with minor injuries. The bridge, part of the Lakeland Freeway, rested on falsework supported by beams standing on the pavement of Worden Road. The pavement sagged and the falsework gave way. Estimated damage: $50,000.

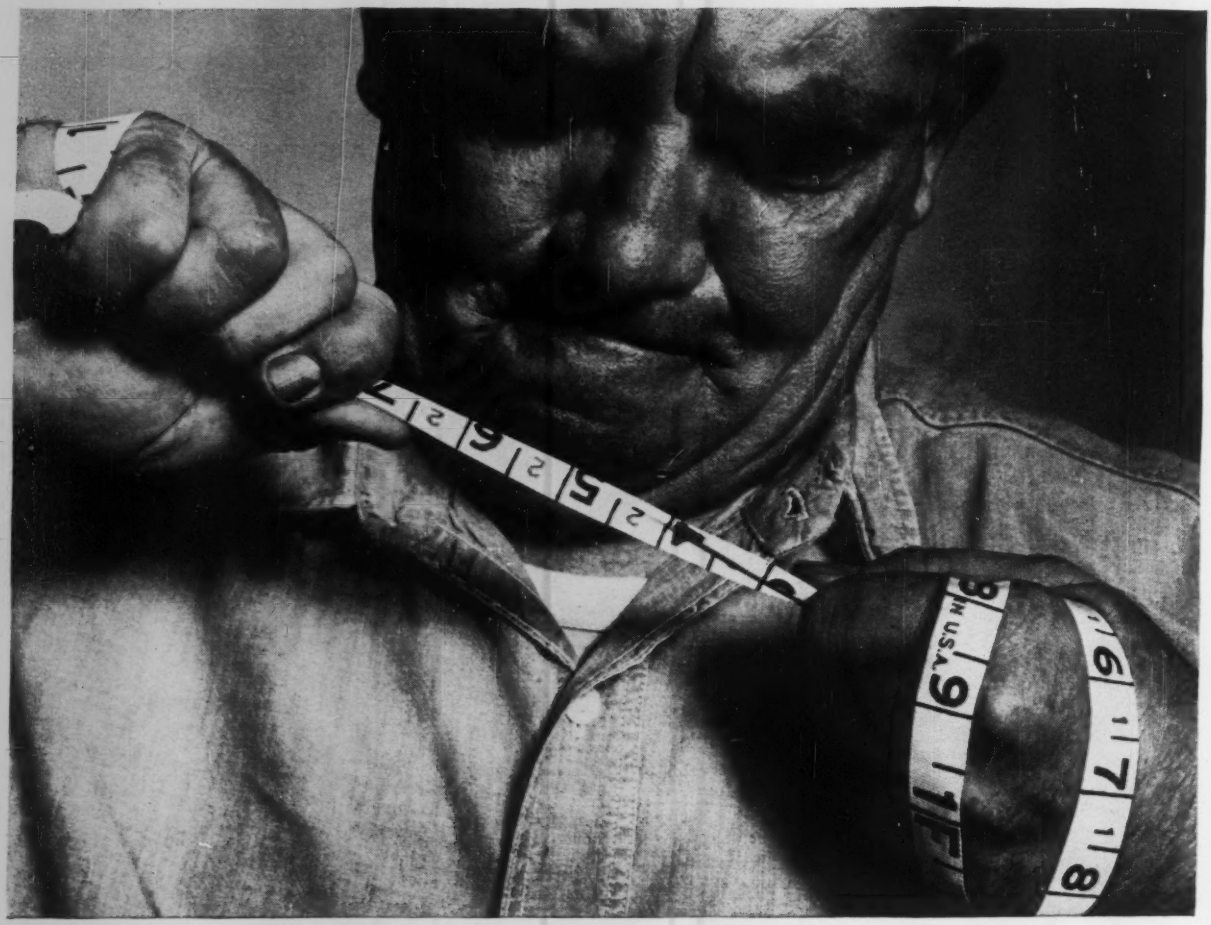
FIRST AID FOR HOSPITALS—Members of the House Appropriations Committee perked up their ears this week at the cost savings expected from a radical design of a hospital planned for Rochester, Minn. Putting the nurses' unit in the core of a circular structure, will drop nursing care costs from $54 to $13.88 a day. The committee voted $185 million for hospital construction, plus another $10 million to stimulate further experiments in hospital design.

IS HARD WATER GOOD FOR YOU?— It may cause palpitations in the water-softener industry to learn that medical men see a possible link between soft water and heart failure. An American doctor first noted the fact last year. Now a British research team has confirmed it.

INCONSPICUOUS CONSUMPTION—Fallout shelter owners, apparently learning a lesson from the experiences of pioneer TV owners, are very sneaky about their shelters. Homeowners in the Los Angeles area instruct contractors building shelters to tell inquisitive neighbors anything but the truth. There will be no open-house invitations if an attack comes.

JET AWAY FROM MY DOOR—The FHA has decided not to insure mortgages on developments in areas where noise from jet planes hits 100 decibels or more. Noise factors could get that high within a half mile of an airport's boundary and in corridors extending 3½ miles from the ends of runways.

WHY NOT LOWER THE RIVER?—Construction of a bridge over the Seekonk River between Providence and East Providence in Rhode Island has been stalled since February because ship owners say the 42-ft clearance proposed for this and subsequent bridges will knock their masts off. The solution: Rhode Island and the federal government will reimburse ship owners for the costs of shortening the masts.



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WASHINGTON OBSERVER

- Does economy need more public works?
- Blatnik probes bid collusion

- **A $1-billion public works program for possible use as an anti-recession measure is in the works.** But it comes at a time when many in the Administration see strong signs of recovery. Treasury Secretary Douglas Dillon, for one, says he believes the recession is over. (This week's figures on April housing starts will give a key indicator of an upturn.)

  Mr. Dillon thinks the Gross National Product—total output of goods and and services—will reach $520 billion to $530 billion by year's end. This would compare with a low of less than $500 billion during the depth of the recession.

  Mr. Dillon, therefore, sees no need for further business stimulants now. He believes the step-up in defense, highway and public works spending ordered by President Kennedy is sufficient.

  But other Administration officials disagree. Labor Secretary Arthur J. Goldberg and Walter W. Heller, chairman of the President's Council of Economic Advisers, are worried about the high rate of unemployment, now close to 7%. They see unemployment continuing into 1962 despite the business upturn.

  Mr. Goldberg and Mr. Heller think the public works program may still be needed as an economic stimulant. They are preparing a package that would include such items as $500 million in federal aid to community facilities, $75 million in job retraining and relocation for the unemployed, and a faster construction pace for dams and power projects already planned. (This week the House Appropriations Committee recommended additional funds for job retraining.) If the unemployment rate remains at, say, 6.5% through August, the President may ask Congress for standby authority to put the public works program into effect.

—

- **The Blatnik highway investigating subcommittee plans a new look at federal anti-collusion laws.** The statutes require individuals and firms bidding on federal-aid contracts to swear that they have not participated in an agreement to rig bids. Violations are punishable by a $10,000 fine and/or five years in prison.

  The subcommittee wants to know just how effective the laws have been, how many prosecutions have resulted. This is one result of last year's hearings. The subcommittee heard testimony that contractors rigged bids on the Oklahoma Skelly Bypass to spread the work around.

—

- **Meanwhile, appointment of a "select" committee to continue highway investigations has been suggested by Rep. Fred Schwengel (R., Iowa).** But the House Rules Committee is expected to reject the idea. Representative Schwengel says an independent group would be less subject to political pressure than the Blatnik committee.

—

- **Watch for a report of airport needs over the next decade.** A committee headed by Francis Fox of the Los Angeles Department of Airports has been studying such matters as accommodations for supersonic planes, access to airports, development of heliports, and all-weather landing aid systems. The committee's report will be submitted to Federal Aviation Administrator Najeeb Halaby in about a week.

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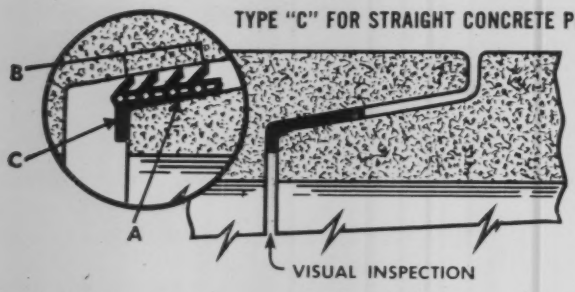

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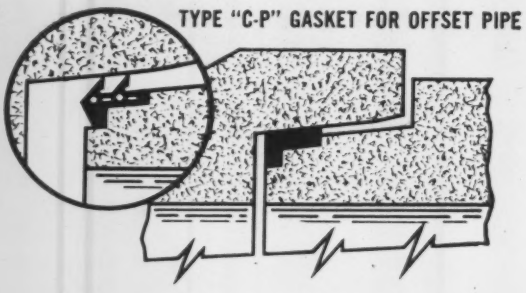

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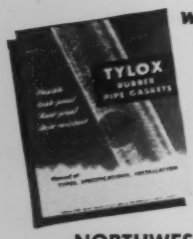

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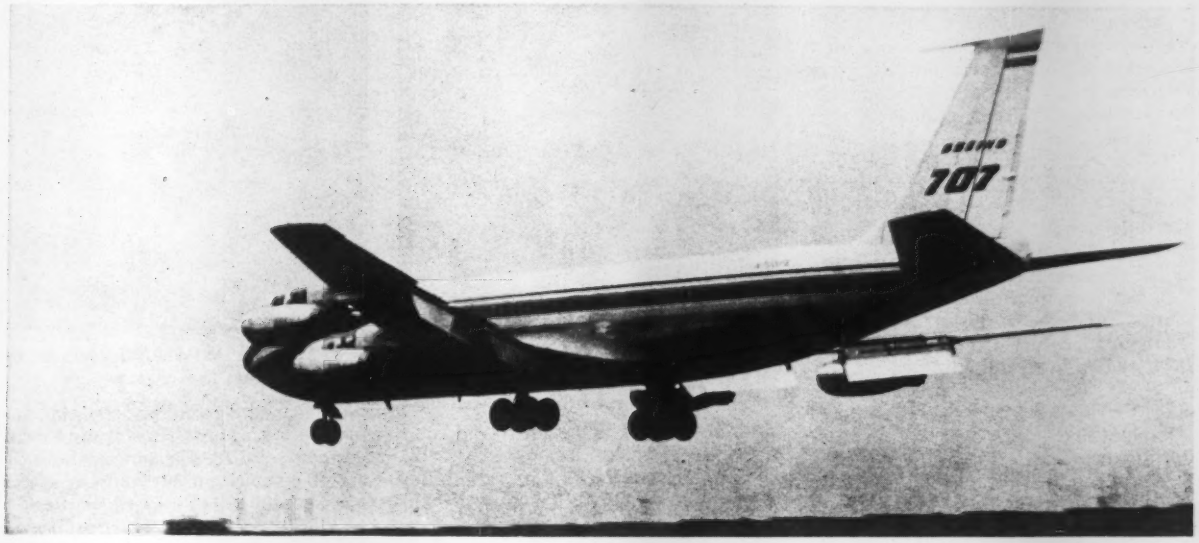


Happy landings may lie ahead, but . . .

Airport Aid Faces a Rough Flight

President Kennedy's aid-to-airports program is off on a bumpy flight through Congress, but it is expected to emerge eventually without substantial damage.

Storm signals went up as soon as Federal Aviation Administrator Najeeb E. Halaby appeared before a House subcommittee to deliver the opening plea for the President's proposal. The bill would extend the airport program, due to expire June 30, for another five years and increase the federal outlay from the present level of $63 million annually to $75 million.

Mr. Halaby had no sooner completed his explanation of the President's plan than subcommittee chairman John B. Williams voiced a blunt and somewhat heated objection to the proposed five-year contract authority. He served notice that he would use the power and influence of his chairmanship to try to scrap the long-range financing provision and attempt to put the program back on an annual appropriation basis.

Representative Williams, a conservative Democrat from Mississippi, thus threatened the feature of the bill that, next to the money total, is of greatest importance to contractors and airport planners. He labeled the contract authority another form of "back-door financing" that represents an undermining of Congress' control over the government purse.

Back-door financing has long been a sore point with the sizable bloc of conservative Democrats and Republicans, and Representative Williams could well muster enough support to remove this feature from the House version of the airport bill. But chances are it would be restored by the Senate and retained in the final compromise legislation. This pattern prevailed in the federal-aid program for depressed areas.

Though the phrase "back-door financing" carries a questionable connotation, the principle involved is a respectable, if controversial, method of government finance. Under the airport bill, Mr. Halaby would be authorized to obligate the federal government to spend $75 million over each of the next five fiscal years as follows:

- $68 million which would be apportioned to the states on a geographic and population basis.
- $7 million to be spent at the discretion of FAA on development of airports for private, business and air taxi planes to relieve congestion at airports where commercial airliners operate.

Representative Williams and his supporters contend that the bill gives Mr. Halaby a five-year charge account against the Treasury, committing the government to spend a fixed amount of money without regard to other budgetary considerations. They also object that it bypasses the traditional requirement that government agencies account to Congress each year on a project-by-project basis before getting authority to obligate government funds.

But proponents point out that long-range contract authority is vital if airport development is to be kept on a stable basis. The lead time on such projects—the time required for site selection, land purchases, planning, preparation of specifications, bid letting, and local financing, which often involves bond issues—is a critical problem.

Herbert C. Godfrey, Jr., president of the Airport Operators Council, told the subcommittee that major airport projects, from the start of plans to finished construction, require as much as five or six years at the maximum and 18 months to two years at the minimum. For this reason, advance assurance of adequate federal aid is a necessity.

Martin Matich, president of Matich Corp., Colton, Calif., speaking for the Associated General Contractors, testified that contractors, like state and local aviation agencies, must also plan and project their work on more than a season-to-season basis. "The farther ahead the contractor can assess his volume of work, distribution of equipment, purchase of materials and utilization of personnel," Mr. Matich explained, "the more economically he can operate and the better prices he can offer."

The airport-aid program has operated

on a long-range contract authority basis since 1955. Before that, from its inception in 1946, it was on an annual appropriation basis. The funds made available fluctuated from a high of $45 million to a low of zero.

Although the contract authorization feature will be an issue, the money total proposed apparently will not stir great controversy—even though it represents an increase of $12 million annually over the amount spent for the past six years.

None of the subcommittee members expressed concern over the proposed increase. All the witnesses either endorsed the higher rate or asked for a larger increase. The airport operators, the National Association of State Aviation Officials, the American Municipal Association, and the Aircraft Owners and Pilots Association suggested the figure be raised to $100 million.

There seems little likelihood, however, that Congress will go beyond the President's request. Sen. A. S. Mike Monroney, chairman of the Senate aviation subcommittee, planned to introduce a $100-million measure, but agreed to $75 million. Finally, he sponsored the Administration's bill in the Senate when he learned the President would not back his original proposal.

In drawing up its program, the Administration worked from two surveys of airport needs—one made by the FAA itself and another prepared jointly by the airport operators, American Association of Airport Executives, and the National Association of State Aviation Officials. The study by the latter group estimates that a total of $1.1 billion is needed for development of 1,338 new and existing airports during the next four years—with $583 million likely to be available from state and local sources and $532 million needed in federal aid.

The FAA's national airport plan also came up with a $1.1-billion estimate of needs. But its projection covers a five-year period, as does the President's bill, and the estimate also includes construction of certain items ineligible for federal aid or financed outside the grant program. Removing these items has the effect of reducing the federal share to approximately $390 million over the five-year period, which is close to the $375 million proposed by Mr. Kennedy.

Besides increasing the amount of federal spending on airports, the Kennedy bill contains a number of new features. It continues the present 50-50 federal-state matching ratio for most airport projects, but provides a federal contribution of 75% for installing in-runway lighting, high intensity runway lighting and runway distance markers, and for purchasing land for approach light systems. (The federal government pays for approach lights out of other funds.)

The higher contribution toward landing aids is a reflection of the Kennedy Administration's intention to put more stress on air safety.

The bill continues the prohibition against federal aid for any airport building, or portion of a building, except those intended to house facilities or activities directly related to safety of operations. The principal effect of this is to continue the disqualification of terminal buildings as projects eligible for federal support. Also continued is the prohibition against participation in the cost of constructing parking lots. But aid in acquisition of land for parking is allowed.

The bill also puts new emphasis on aid for so-called general aviation airports—those serving aircraft other than commercial airliners. The $7 million provided for this purpose can be allotted without regard to geographical limitations in apportioning aid. The idea is

NAJEEB E. HALABY, FAA head, pleads for long-term aid to airports.

REP. JOHN B. WILLIAMS wants to keep the purse-strings in Congress.

. . . If Bill Passes, Spending Plans

Even as hearings were going on in Washington, the promise of long-range aid to airports stirred civil engineers and airport operators to talk of ways to spend airport funds more effectively.

Airport aid was very much on the minds of those attending the Third National Airport Conference in Miami last week. The conference is sponsored by the Air Transport Division of the American Society of Civil Engineers and the Airport Operators Council.

George Dement, Chicago's Commissioner of Public Works, told conferees that pending legislation offers assurances that airport master plans can be made on a business-like basis. Mr. Dement said airport planners are happy with "project horizons" of five years.

"Master plans have been in existence at most airports for years, but they were in many cases little more than dreams because of the uncertainty of federal financial participation in the plans, brought about by the policy of year-to-year congressional appropriations," Mr. Dement said.

FAA Administrator Najeeb E. Halaby said he hopes soon to have a national airport system. Big problems are access to airports, supersonic noise, helicopter operations and regional coordination of airports. His aim, said Mr. Halaby, is more safety and consideration of the "health of the airport community."

Referring to Washington's Dulles International Airport, he said he will go ahead and use the traveling lounges (ENR Mar. 9, p. 23), but he wishes someone had tried them out before buying the idea. However, he does think it will work.

Ray O. Kusche of Los Angeles, president of Quinton Engineers, told the group: "The character of our urban areas will be shaped in great part by the way we plan for transportation needs. And in most urban areas, we must plan in terms of a regional airport system to avoid creation of separate airports by individual communities, which could result in inconvenience to airline users."

Cost of new airports (at least, major airports) must be spread fairly among airport users in areas served by the system, Mr. Kusche declared. He said comprehensive airport planning should be coordinated with all other aspects of land-use planning.

In addition to airport needs and planning, ASCE speakers discussed aircraft design as related to runway length and other factors; airport lighting; and design and construction practices for prestressed concrete pavements.

SEN. A. S. MONRONEY pushes airport bill in the Senate.

to relieve congestion at major metropolitan airports.

The FAA's national airport plan shows a need for 131 new public general aviation airports. Though it is not generally realized, the operations of private, corporate and taxi-type planes far outstrip those of commercial airliners. There are 42 times more general aviation aircraft, and they log four times the number of hours flown annually.

Are Ready

Supersonic aircraft now in design stages may weigh from 200,000 lb (Mach 2) to 450,000 lb (Mach 3); equivalent single-wheel loadings may be as high as 120,000 lb. Such loads will require strengthening or rebuilding of major airport runways. Runway pavement smoothness requirements may increase, as will problems of snow and slush removal. Runway lengths and widths probably will not be affected.

Paul Stafford and Martin Warskow of the Airborne Instruments Laboratory, Cutler-Hammer Corp., Deer Park, N. Y., described factors that affect practical airport capacity. They presented an analysis technique that uses mathematical models to predict capacity in terms of operating rate and delay.

Engineers can use the method to determine when a proposed project can be economically justified, or which of several possible solutions is the most economical.

Professor Robert Horonjeff of the University of California's Institute of Transportation and Traffic Engineering reported the results of studies of high-speed exit taxiways for the Federal Aviation Agency. Mr. Horonjeff described the method of developing a mathematical model for the study and its application to the location of exits.

Probers hear tower failure was . . .

A Case of Too Little Too Late

The congressional probe in the collapse of Texas Tower No. 4 last week uncovered design conflicts, construction disagreements, and performance variances. The testimony left the Senate Preparedness Subcommittee of the Armed Services Committee in a quandary as to just how well the project was conceived and carried out.

Because of impending court-martial proceedings by the Air Force over the loss of the 28 lives in the disaster, the Senate committee is steering clear of this issue. But it wants to know just why the tower collapsed and who is to blame. The senators also want to know how safe Towers No. 2 and 3 are.

One immediate point bothering the senators is why the firm that designed the towers for the Navy—Moran, Proctor, Meuser & Rutledge—has been given a $200,000 contract to evaluate the present strength of the two towers that remain. Some congressmen don't think it quite proper that the firm should evaluate its own work.

When the hearings drew to a close, there was little doubt that Tower No. 4 was plagued with construction problems from its very beginning.

Leon B. DeLong told the committee that he did not consider the design of the tower adequate for its purpose, nor did he like the construction method used (ENR May 11, p. 18).

E. G. Rau, vice president and chief engineer for J. Rich Steers, Inc., told the senators that his company did not approve of the method used to tow the partially assembled tower to its construction site, as laid down by the designers. The tower suffered damage during its tow to the site, and repairs had to be made there. Other witnesses testified that they did not believe the towing damage could have been adequately repaired at the on-site location.

Alan Crockett, of Marine Contractors of Boston, told the senators that his firm had made three underwater surveys of the tower. The first was made in November 1958 when it was found that underwater collars on the structure had worked loose. In June 1959, the second underwater inspection showed that T-bolts fastened to the collars had corrected this situation.

In February 1960, Marine Contractors made its third inspection and found considerable deterioration in the pin connections of the underwater bracing to the tower legs.

Moran, Proctor, Meuser & Rutledge then called for emergency repairs to be made on the tower before the August hurricane season started. These were accomplished early in August 1960. In September, however, Hurricane Donna caused further severe damage.

After the Donna damage, all further underwater inspections were made by J. Rich Steers, Inc. Following the damage done by Donna, the senators were told that the Air Force wanted an evaluation made on the remaining strength of the tower. Steers hired Moran, Proctor, Meuser & Rutledge to handle the job on a subcontract basis. The two companies agreed verbally on the matter on Oct. 3, 1960. But it was not until Jan. 4, 1961, that a final confirmation was made. And the study was never accomplished, the committee was told.

On Jan. 7, 1961, an underwater inspection made by Steers revealed that one diagonal on the lowest underwater panel was broken. At this point, Steers was supposed to install wire cable bracings to substitute for two upper panels on the two shoreward legs of the tower. This was never done, however. When the lower diagonal was found to be broken Steers said it could not perform all repairs to the tower under its present contract. On January 12, contract negotiations were started to work out the cost difference. The tower failed January 5 (ENR Feb. 2, p. 22).

Theodore M. Kuss of Moran, Proctor, Meuser & Rutledge told the Senate committee that, even if the cable bracings had been installed, the tower would only have been about 55% as strong as its original designed strength.

Further complicating the picture, Given A. Brewer of Brewer Engineering Laboratories, Inc., Marion, Mass., reported that his firm had conducted motion studies on the tower between the fall of 1958 and the winter of 1959. It was found, Mr. Brewer testified, that there was a plus or minus 3-in. sideways movement of the tower platform and a twisting, rotational motion of 1/10 of a degree. This was far above the design tolerance, but the bracings were not preventing the movement.

Mr. Brewer also said it was found the tower had a design frequency of 37 cycles per minute, but was actually achieving only 19. This, too, pointed to improper functioning of the bracings.

While the tower was designed to withstand 125 mph winds with 35-ft-high breaking waves, Mr. Brewer's study showed that waves only 10 to 12 ft high caused more tower motion than waves in the 30-ft-high range. Reason: The smaller waves have about a 155-ft wave length, allowing for two waves to break simultaneously on different sections of the tower; the bigger waves have longer wave lengths so that the tower is only battered by one wave at a time.

Basement Formwork Collapses

Timber falsework for five underground concrete floors of the United California Bank Building under construction in Beverly Hills, Calif., toppled without warning May 8. No one was injured, since the collapse occurred at 11:30 p.m.

Three 4-in.-dia water mains ruptured, pouring water into the excavation and undermining streets. The break also obscured the cause of the failure.

Investigators now are uncertain: Did the mains break first and wash out the shores supporting the 100 x 30-ft section of formwork; or did falling timbers rupture the mains? One theory blames vibration from traffic, which might have caused earth slippage. The eight-story, $13.5-million building borders heavily traveled Wilshire Blvd. The street has since been closed to traffic.

Four of the underground floors will provide 275,000 sq ft for parking 1,100 cars; the fifth will offer rental space. S. Jon Kreedman is the builder. Charles Luckman Associates are the architects. Morris K. Goldsmith of Los Angeles is structural engineer.

Super Dome for a Supermarket

The largest aluminum dome in the U.S. will be the main building in a suburban shopping center in Marin County, Calif., four miles north of the Golden Gate Bridge.

An improved version of the one erected in Moscow for the U.S. National Exhibition (ENR June 25, 1959, p. 24), the gold-anodized dome will span a 200-ft-dia floor area of 30,000 sq ft. The dome rises 76 ft.

Half of the dome will house a supermarket; the other half will house individual shops.

R. C. Mahon Co. of Detroit and Torrance, Calif., will erect the dome with a telescoping mast, hydraulically operated. Components will be supplied by the Kaiser Aluminum Co.

Harbor Point Associates of Marin County is the general contractor on the $1.5-million dome. John Bolles, architects-engineers, of San Francisco, designed the $3-million project.

Spec Changes Soon

AISC plans revisions for bolts, composite beams

Within the next few weeks, the American Institute of Steel Construction will announce revised bolt specifications that will make structural steel less costly. And before the end of the year, AISC will update its specification for building framing, to include many other cost-cutting changes for structural steel.

These steps in the battle to stimulate greater use of steel in construction were announced at the AISC's 13th National Engineering Conference, held in Minneapolis last week.

W. A. Milek, Jr., AISC research engineer, told the conference that the revisions in the bolt specification are based on recent tests at the University of Illinois. These tests showed that washers, now required with bolts, actually are unnecessary. The revised specification will reflect this finding. It already has been approved by the Research Council for riveted and bolted structural joints.

Mr. Milek also predicted changes in specifications for composite beams. Tests indicate, he said, that present rules for design of shear connectors are grossly conservative. Also, there is no difference in strength between beams with shear connectors distributed in accordance with the shear diagram and beams with the total number of required connectors uniformly distributed along the span. The new AISC specification for steel for buildings will take advantage of these conclusions.

T. R. Higgins, AISC director of engineering and research, announced that a first draft of the proposed manual on orthotropic plate design should be ready for circulation in July. This type of design has been used by German engineers for long-span girder bridges. Roman Wolchuk, New York City consulting engineer, prepared the manual.

Studies show, Mr. Higgins reported, that if orthotropic plate design had been used for recently constructed U.S. bridges, 35 to 45% of the steel could have been saved and dead weight reduced 45 to 60%. Complexity of stress analysis, however, has hindered use in the U.S. of orthotropic plate design, in which a stiffened steel plate serves as both deck and top flange. The AISC expects the manual to make stress analysis easier.

The specification also will incorporate results of the thin-web plate-girder project at Lehigh University. Konrad Basler, of Zurich, Switzerland, who worked on the test program when he was at Lehigh, presented some of the new formulas for girder webs with large ratios of depth to thickness.

Senate cuts housing out of its appropriation . . .

Has the Capehart Program Had It?

The future of the Capehart military housing program is up in the air. The Senate last week chopped the program out of a bill authorizing $879.7 million worth of military construction of all types. But earlier the House had continued the program in its military authorization measure.

House and Senate conferees will try to iron out their differences over military housing and over money in a conference this week.

The Capehart program has drawn fire in recent months as an "uneconomic" method of providing family housing for military personnel. The controversy came to a head during a recent Senate investigation into contractor Hal B. Hayes' default on about $55 million worth of Capehart housing (ENR Mar. 16, p. 75).

Under the Capehart program, the government avoids direct financing. Instead, a builder erects and finances the housing under a special program of the Federal Housing Administration, which insures the Capehart mortgages. These are retired by the military with personnel housing allowances.

The House not only voted to continue the program, but authorized the Defense Department to put up 5,000 more housing units than it requested. The Senate went along with Pentagon plans for construction of 2,025 new family housing units, but voted to provide a direct appropriation. This means the construction would be handled under conventional military construction methods—contractors would have no mortgage financing responsibilities. In addition to military-housing concepts, conferees must compromise on amount of authorizations.

The House's authorization bill for fiscal 1962 totals $805.3 million. The Defense Department's revised authorization request totals $942.1 million, including $71.3 million tacked on to Mr. Eisenhower's budget by the Kennedy Administration. No major cuts are involved; the over-all reduction just reflects bits and pieces chopped out of projects the military had not sought. The House's intent was to keep the authorization and appropriation amounts pretty much in line.

So far there has been no congressional action on the military construction appropriation bill for the coming fiscal year. Committee hearings have yet to be completed.

The Senate version of the authorization bill breaks down this way: Army, $134.7 million worth of construction; Navy, $180.3 million; Air Force, $489.6 million; Defense Department, $8.3 million; and Reserve Forces, $66.8 million.

The Senate urged the Pentagon to continue awarding construction contracts "on a competitive basis to the lowest responsible bidder." In fiscal 1960, only 4% of military construction contracts were awarded through negotiations.

Of the Army's construction program, $71.3 million is earmarked for the continental U. S.

The Navy earmarks $76.5 million worth of construction in the continental U. S. The Air Force's program calls for construction of new facilities at 122 major installations, of which 80 are in the U. S.

The largest single portion of the program—58.7%—will go for construction of intercontinental ballistic missile sites, practically all for Minuteman missiles. Minuteman plans consist of nine additional squadrons at three base locations.

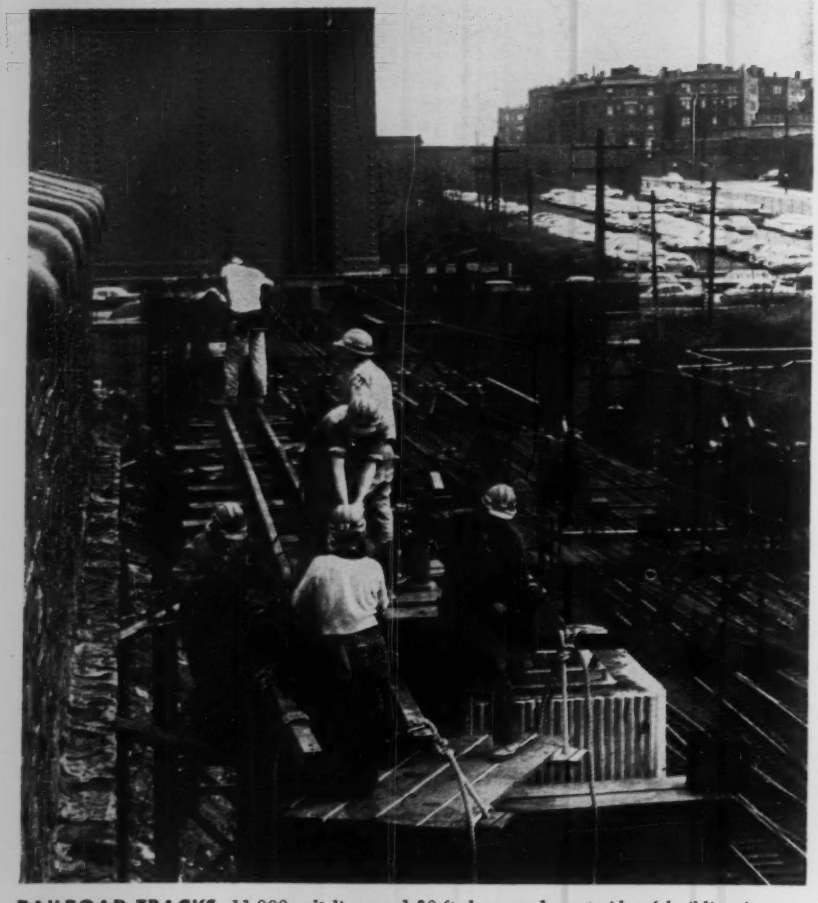
How Congress Sees Military Construction

State	Installation	House Bill (add 000)	Senate Bill
ALA.	Redstone Arsenal	$5,038	.....
ALASKA	Army, Eielson Air Force Base	2,897	$2,897
CALIF.	Marine Corps Base, Camp Pendleton	6,101	6,010
	Naval Seabee Center, Port Hueneme	.....	3,300
	Naval Air Station, Lemoore	279	3,579
	Naval Hospital, Long Beach	8,763	.....
	Naval Air Station, Miramar	2,591	2,591
	Pacific Missile Range, Point Mugu	2,791	2,791
	March Air Force Base	6,280	6,280
COLO.	Norad Headquarters, Colorado Springs	12,400	12,400
D. C.	Naval Station	6,000	.....
FLA.	Naval Station, Mayport	470	2,880
GA.	Fort Benning	10,524	10,524
	Turner Air Force Base, Albany	3,481	3,481
ILL.	Naval Training Center, Great Lakes	4,952	4,952
MD.	Army Chemical Center	4,029	4,029
	Naval Academy, Annapolis	9,687	7,730
	Andrews Air Force Base, Camp Springs	2,692	2,692
MASS.	Quartermaster Research and Eng. Center	3,812	3,812
	Hanscom Air Force Base, Bedford	2,819	2,819
	Westover Air Force Base, Chicopee Falls	8,876	8,677
MO.	Fort Leonard Wood	4,081	4,081
MONT.	Glasgow Air Force Base, Glasgow	2,716	2,716
NEB.	Offutt Air Force Base, Omaha	541	4,854
NEV.	Nellis Air Force Base, Las Vegas	433	4,663
N. Y.	U.S. Military Academy	4,222	4,222
N. C.	Marine Corps Air Station, Cherry Point	4,864	4,703
	Marine Corps Air Facility, New River	2,731	2,731
N. DAK.	Minot Air Force Base, Minot	2,677	2,677
OKLA.	Fort Sill	8,695	8,695
PENNA.	Naval Shipyard, Philadelphia	4,000	.....
S. C.	Naval Station, Charleston	5,951	5,951
TENN.	Arnold Engineering Devel. Ctr., Tullahoma	18,500	18,500
TEXAS	Fort Hood	3,054	3,054
UTAH	Hill Air Force Base, Ogden	1,820	6,770
	Hill Air Force Range, Wendover	7,289	.....
VA.	Langley Air Force Base, Hampton	3,160	.....
Zone of Interior	Various Locations	12,283	29,861
	Various Locations	3,038	3,083
	Various Locations:		
Classified (Zone of Interior)	Army	6,245	.....
	Navy	20,091	29,052
	Air Force	251,900	285,300

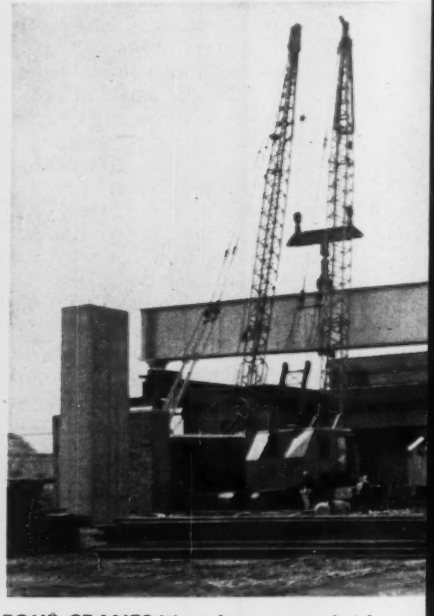
SUBSTATION within the right-of-way and on the column line of New York City's Bruckner Expressway had to be maintained, so planners decided to widen the spread between three sets of columns to bridge the structure.

Built-Up

A Consolidated Edison substation in the Bronx, N. Y., posed some problems for engineers and contractors on one section of the seven-mile-long, $67-million Bruckner Expressway. The station's thirty-four 4-in. cables power this



RAILROAD TRACKS, 11,000-volt lines and 30-ft drop made east side of building inaccessible for cranes. To get beam into place, Bethlehem built 60-ft-high towers, spanned them with stringers, cross ties and track for winch-pulled dolly.



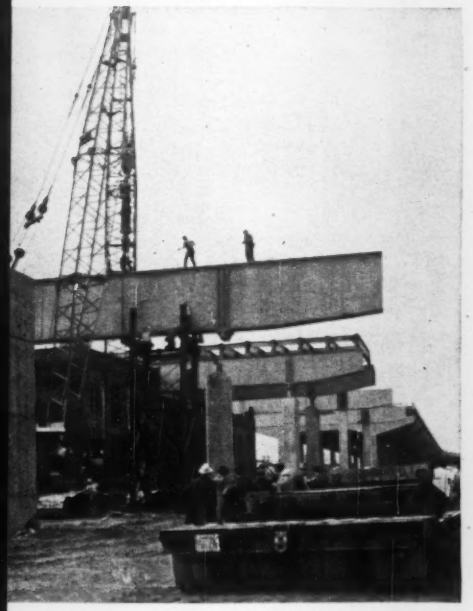
FOUR CRANES lift girder to proper height at north end of building. Rigs at left relinquished their load after placing their end of

BIGGEST BOX GIRDER ever fabricated at Bethlehem Steel's Pottstown, Pa. works is one of three needed to bridge the building. This one—131 ft long, 10 ft 10 in. high, 4 ft 10 in. wide—weighs 164 tons. Two trucks carried it from railroad to job site.

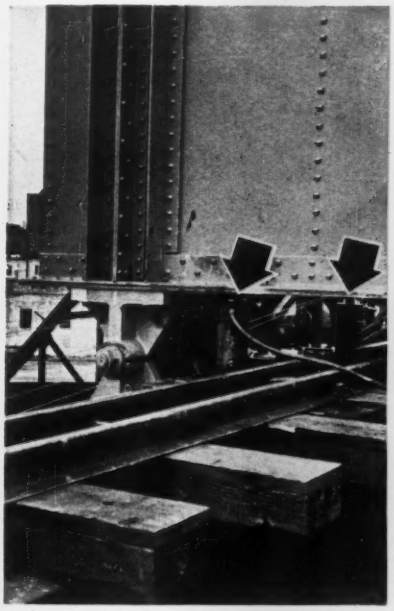
Box Beam Bridges a Building

entire section of the Bronx, so removing the station would have been tremendously expensive. But the building is in the way of a line of piers for the elevated road whose six lanes will connect the Triborough, Throgs Neck and Bronx-Whitestone bridges with the New England Thruway and the Hutchinson River and Merritt parkways.

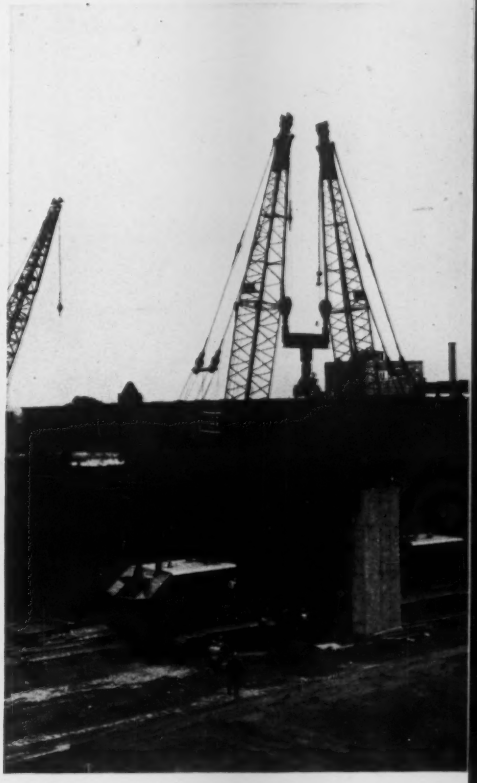
The pictures of the erection of one girder show what Bethlehem Steel Co. did to solve the problem.



girder on the dolly. Cranes at right walked load backward over the roof at same speed as the winch pulled the dolly.



HYDRAULIC JACKS (arrows) raised girder so dolly could be removed, then lowered the girder onto its bearing.



TWO CRANES that carried west end of girder over the roof place their end of the load on bearing atop pier.

Should the AEC have issued a permit?

Reactor's Future Up to Supreme Court

The future of an $88-million nuclear power plant is at stake in the biggest court battle yet to come from the infant nuclear energy industry.

The U.S. Supreme Court has just heard arguments in the Fermi fast breeder reactor case. It probably will decide this fall whether AEC acted legally in permitting the Power Reactor Development Co. to build the reactor at Lagoona Beach, Mich. The reactor is 90% complete. PRDC is comprised of 21 private utilities and manufacturing companies.

Parties in the case are three AFL-CIO labor unions, the Atomic Energy Commission and PRDC. The unions have argued since 1956 that AEC disregarded basic safety standards imposed by the Atomic Act and AEC's own regulations when it issued a "provisional" construction permit for the 100,000-kw power reactor.

The labor view is backed by a 1956 report by the Commission's advisory reactor safeguards committee, questioning safety characteristics of the breeder reactor. Also, two weeks ago the Supreme Court accepted a brief filed by Adolph J. Ackerman, consulting engineer, Madison, Wis., in which he supports the contention of insufficient safety. He charges that the site is badly chosen from a safety standpoint. Trained engineers and scientists, he said, were not allowed to exercise their professional responsibilities in its selection.

If the court agrees with the unions that AEC's safety findings were inadequate when it issued the construction permit, the reactor will remain inactive until the builders repeat the whole licensing process. This takes time.

But if the court decides that AEC's provisional construction permit met all safety standards, the reactor may begin power operations shortly after completion next December.

The three unions (radio and electrical, auto workers, and paperworkers) intervened in AEC's regulatory proceedings when PRDC first requested a construction permit in 1956. The unions argued that AEC must make the same safety findings for a construction permit as for a later operating license. AEC rejected the argument then and again in May 1959 when it renewed the permit. At this point, the unions decided to take their case to the U.S. Court of Appeals.

The construction permit would subject AEC to great pressure later to approve operation of the finished reactor, the unions said. They contended such pressure could undermine AEC's responsibility to protect the public from nuclear hazards.

AEC argued before the Appeals Court that the permit met statutory and AEC safety standards. The Commission maintained that many technical problems may be resolved during construction. To hold up construction until all research-development problems are out of the way would hamstring all reactor development, the Commission said.

The Court of Appeals sided with the unions last June. It ruled that AEC did not make essential safety findings before issuing the construction permit.

The court also objected to the plant's location, about 30 miles from Detroit. No reactor should "without compelling reasons, be located where it will expose so large a population to the possibility of a nuclear disaster," it said.

The court ordered the construction permit set aside but withheld execution, pending the Commission's appeal to the Supreme Court. Construction continues meanwhile.

Around the Country . . .

• **Desalting study**—A group of top engineers and scientists will evaluate the nation's saline water conversion program this summer. The National Academy of Sciences, the National Research Council and the U.S. Interior Department are joint sponsors of the month-long study. The study is part of the Kennedy Administration's over-all analysis of the U.S. saline water conversion effort.

• **Tough talk**—The Pennsylvania State Department of Labor and Industry has ordered officials of 1,686 schools in 58 counties (excluding the cities of Philadelphia, Pittsburgh and Scranton) to correct violations of fire and panic regulations. Penalty for non-compliance with the directive: closing of the school.

• **Asphalt papers wanted**—University of Michigan officials invite papers for presentation at the International Conference on Structural Design of Asphalt Pavements to be held at Ann Arbor Aug. 20-24, 1962. Deadline: Oct. 1, 1961.

• **Bechtel gets Don Pedro Dam**—Bechtel Corp., of San Francisco, will handle design and engineering for the proposed $80-million Don Pedro Dam on central California's Tuolumne River. Voters must authorize a bond issue before actual construction can begin.

• **Atomic translations**—Translations from Japanese and Russian nuclear literature are now listed in a monthly bulletin Transatom. Bulletin tells who the originating agency is and from whom translations may be requested. Annual cost, $8; single copies, $1. Write: Transatom c/o EURATOM, 51 Rue Belliard, Brussels, Belgium.

• **Commercial center**—A $20-million commercial development, McCulloch Center, comprising three office buildings and a restaurant, will be located adjacent to Los Angeles International Airport. Construction of a 12-story office building and a one-story restaurant will begin in November.

• **Need help?**—To find out how your community can get help from the new depressed areas program, write Area Redevelopment Administration, U.S. Commerce Department, Washington 25, D. C. Ask for their new pamphlet, "Your Community and the Area Redevelopment Act."

• **Light tower low bid**—The Perini Co., Boston, has submitted the low bid for construction of two Coast Guard offshore light towers at $1,415,000. The towers will replace lightships off Buzzards Bay, Mass., and Brenton Reef, R. I.

• **Welding papers wanted**—The 1961 Lincoln Arc Welding Program will accept papers in two categories—machines and structures. Each paper must describe the design of a machine or structure in which welding is of major importance. There will be 76 individual awards totaling $25,000. Deadline: July 17, 1961. Mail entries to James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

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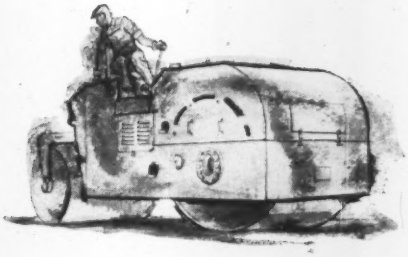

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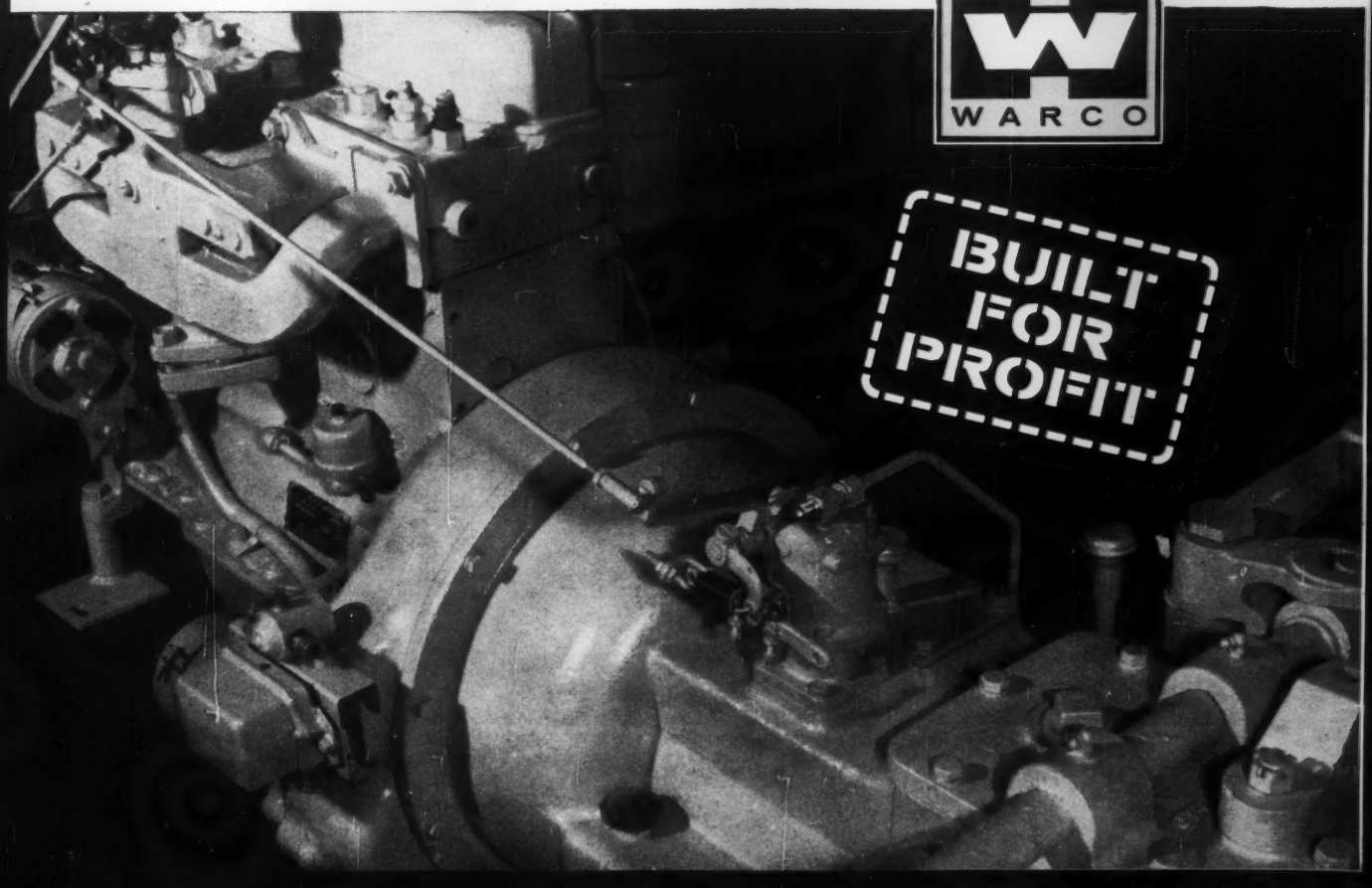
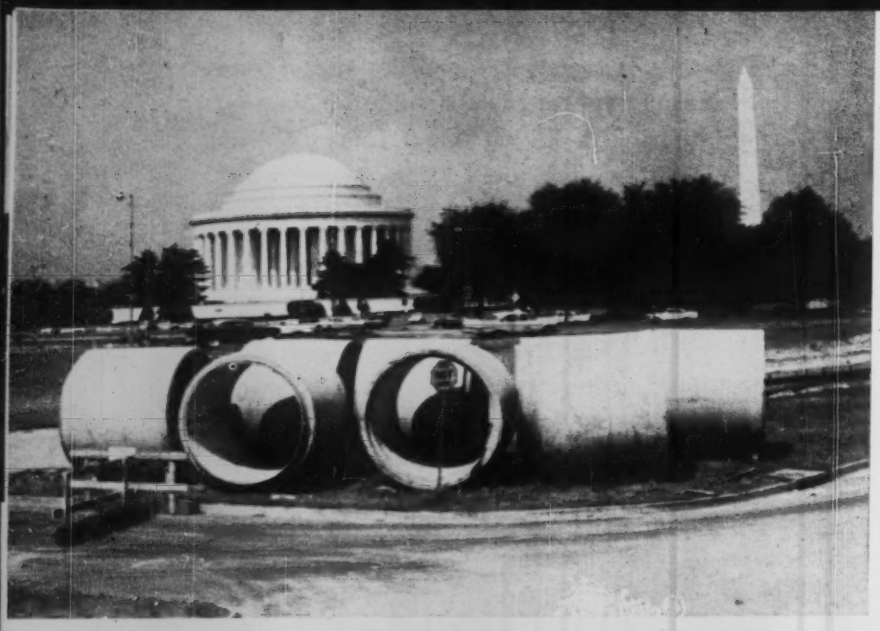




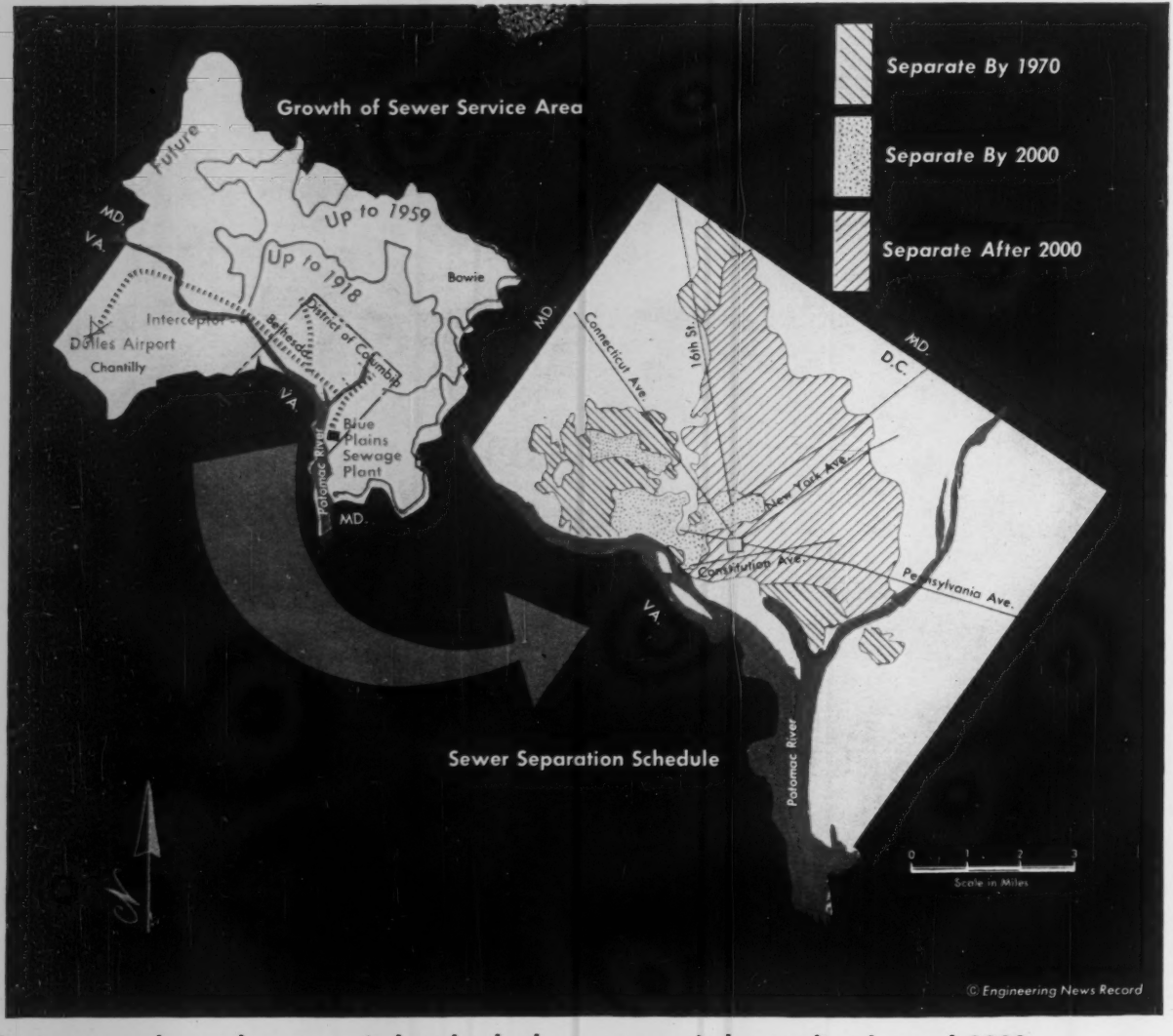
Monuments form typical Washington backdrop for sewer work.

Washington

The casual eye discerns no pattern in the scattering of sewer jobs in and around Washington, D. C. The torn-up streets and pipeline excavations appear routine and unrelated. But they are the first visible evidence of a long-term and rigorously timed construction job aimed at cleaning up the Potomac River in the vicinity of the capital.

This objective requires separation of all existing combined sewers built in the District of Columbia during the last 120 years. The campaign will go on for the next 40 years and beyond and will cost an estimated $300 million.

• **Interceptors come first**—Current jobs are part of the first phase—a six-year, $100-million drive now in its second



Long-range plan embraces capital and suburbs over a period extending beyond 2000.

Builds to Clean up the Potomac

year. This phase includes six miles of double-barreled and 15 miles of single-barreled riverfront interceptor inside the District plus a 41-mile interceptor extending up the Potomac to Dulles International Airport. Contract awards in the first phase will reach a peak this year.

The D. C. Department of Sanitary Engineering is concentrating on the interceptors and continuing with the separation of storm and sanitary flow in about a tenth of its combined system area.

Three advantages persuaded the engineers to give the trunkline top priority in their long-term program.

First, once it is in service, they can begin work on tributary areas with complete flexibility, whether in accord with the presently planned schedule or not.

Second, the riverfront interceptor in itself will significantly reduce discharges of mixed stormwater and sanitary sewage into the Potomac.

Finally, the twin-barrel design permits all sanitary sewage from upstream separate-sewer areas (above the older part of the city) to be conveyed the entire distance to the D. C. treatment plant in a closed pipe that contains no overflow weirs. Sewage collected by the airport interceptor will travel through this conduit.

The six-year program is a modified version of a plan known as Project C, recommended by a board of engineers (Samuel A. Greeley, Frank A. Marston, and Gustav J. Requardt) in 1957, after two years' intensive study. Estimated to cost $71.7 million at 1956 prices, Project C was deemed the most realistic, in terms of pollution abatement and first cost, among three plans developed by the consultants. D. C. engineers remodeled the plan to make it strictly a foundation project for eventual full conversion of the entire city to separated sewers.

• What Project C will do—Increasing pollution of Washington waters became critical in 1957. The U.S. Public Health Service in August of that year declared that pollution dangerous to public health existed in the Washington metropolitan area. Rising public demand for effective control gave needed support in Congress and in the District to programming sewer improvements for complete conversion.

The Sanitary Engineering Department added two express sewers to Project C for sanitary sewage, one of them the river-front interceptor mentioned and a second one from separated systems in Maryland and upper D. C. areas of the Rock Creek watershed. The Department deleted a provision for a combined system relief sewer along the downstream reaches of Rock Creek that would have perpetuated the evils of mixed overflows.

Sewer separation continued through a long hard winter.

The District and the Washington Suburban Sanitary Commission are also jointly building an interceptor along the east bank of the Anacostia River.

Pollution abatement benefits in addition to those already noted will become effective on or before completion of Project C in 1966. The new sewers, sized for long-term population growth, will be large enough to give early relief to the most objectionable aspects of mixed sewage overflows.

After 1966, the Potomac will receive no sewage contamination whatever in the first 3½ miles of its 10-mile transit past the capital. Director David V. Auld of the Sanitary Engineering Department is confident that Project C will make the Potomac as clean as, or cleaner than, any other river similarly situated with respect to a major city. Further, he and his engineers point out, Washington and its metropolitan area will enjoy the benefits of the initial project throughout the long period required for total separation.

Centralized sewage treatment for the District and its fast-growing Maryland suburbs is a mighty force for pollution control in the entire metropolitan complex north and east of the Potomac. All this territory, with a present sewer-connected population of 1.2 million, delivers its sewage to the District's Blue Plains plant. Nearby Virginia also sends some sewage to Blue Plains and will send more after the Dulles Airport interceptor starts operation.

Last year, the District began full operation of a $12-million secondary treatment addition at Blue Plains to treat sewage with some storm water and thus further diminish pollution discharge into the river.

Two factors are helping the District get the big conversion job done: authority to borrow, granted by Congress in 1954 and increased in 1960; and a plumbing code requirement that all new and remodeled buildings install separate drainage lines to the street.

Under the borrowing authority, the Sanitary Engineering Department can get sanitary sewer and water construction money from the Treasury and repay it out of revenues. Stormwater facilities are excluded, however. They must be paid for out of the District's general fund, which Congress usually pares before approving. Delays ensue but Director Auld expects to make them up by 1966.

The plumbing code provision is reducing the District's sewer separation costs. Normal rapid redevelopment of real estate in the older parts of the city will take care of much of the separate sewer connections on private property. These in general cost as much as the new street sewers. This policy will effect great savings in the urban redevelopment area.

(Please turn the page)

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Tearing Up 70 Blocks of Streets in Minnesota — Operator says, "This rubber tired rig is handy for stripping old blacktop right off the road . . . we work a block here and a block there, and I can *move to them as fast as any truck.* The bucket control is exact for windrowing in second gear. With a _____ machine, you couldn't do this kind of work."

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Sand and Gravel Operation in Michigan — Operator says, "I've been driving cranes, dozers and loaders since 1936 but this is *the best front end loader I've used.* It's a wonderful machine, it operates so much easier than the _____ we have here."

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• **Sewer and highway coordination**—Because timing of sewer projects is keyed to the city's traffic needs and highway program, tributary areas sometimes must be sewered far ahead of the long-range schedule. This produces the deceptive patchwork of jobs.

Where a project involves both highways and sewers, the department having major responsibility at the site often builds the sewers. Thus a Department of Highways contractor is installing a section of parallel sewers, 6 ft and 8 ft in diameter, under the D. C. approaches to the new 14th St. (George Mason) Bridge. Likewise, the same department is handling the contract construction of a double-barreled sewer structure to go beneath the ramps to the Theodore Roosevelt Bridge, now under way.

Both of these sewer sections were given high priority on the Project C schedule to keep pace with the rapid advance of related highway construction. For a similar reason, the Department of Sanitary Engineering recently awarded (in March) a $2.3-million Project C sewage pumping station that will be closely flanked by two approach ramps to the Roosevelt Bridge.

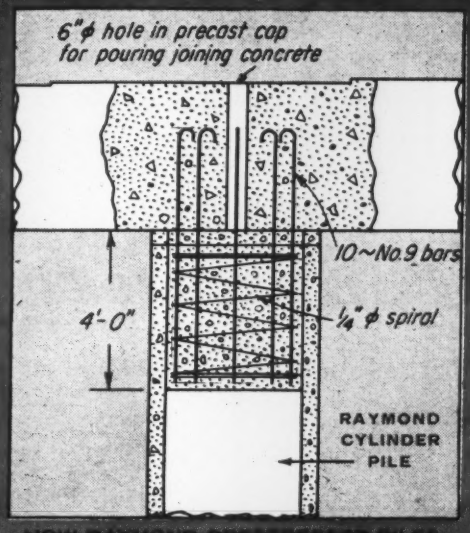
A good example of shuffling the schedule for the sake of coordination between highways and sewers is the current construction of separate sewers in the central city from Scott Circle (16th and Massachusetts) through L and I streets, via New Hampshire Ave. and the Highway Department's grade separation at Washington Circle, to the riverfront interceptor.

Highway and Sanitary Engineering Departments of the city coordinated the timing of this project. As soon as the sewers are in place, the Highway Department will completely repave L St., a badly needed job that has been held up for five years until the sanitary engineers could finance the sewers.

The sewer construction, in turn, was advanced a dozen years to eliminate later street cuts.

While pushing ahead with Project C, the Department of Sanitary Engineering is accelerating construction of the 41-mile Potomac Interceptor to Dulles Airport and adjacent areas on both sides of the river. Congress last year delegated construction responsibility for the job to the District.

A special Potomac Interceptor division under James W. Head, Jr., aims to make up the three-month setback to field investigations caused by the heavy snowfall of last winter. The first $5-million contract of $25 million to be let this year will be awarded in June, more than two months later than previously planned. However, all 35 miles of mainline sewer in the project will be under contract by Christmas, the engineers declare, and the job will be completed on schedule by mid-1963.



HOW RAYMOND PRESTRESSED PILES ARE TIED TO PRECAST CAP

PONTCHARTRAIN TO PENSACOLA:

RAYMOND and the case of the traveling bridge

From an assembly line two hundred miles away, thousands of Raymond prestressed concrete cylinder piles were floated to the site of the new $8,000,000 Pensacola Bay Bridge.

Because of tricky bottom conditions many of the 54-inch Raymond piles—enough to support about 3,000 feet of the bridge—were built to a length of 164 feet, quite probably the longest ever used for a bridge in this country. The precast, prestressed deck slabs reach a span of 60 feet and weigh about 156 tons apiece, providing twin roadways, each 26 feet wide.

Much time, meaning much money, was saved by using these post-tensioned Raymond piles, even though they had to be barged for 200 miles from the yard in Mandeville, La. Incidentally, this yard was set up originally to fabricate the same type of Raymond pile for the magnificent Lake Pontchartrain Causeway.

It is this quality, derived from long experience and creative engineering ability, that Raymond offers as stock-in-trade. Foundations often present unusual problems and we are equipped to handle most of them, however large or small, on land or under water. May we be of help to you? Just call or drop a line to any of the Raymond offices here or abroad.

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CONTRACTORS: a joint venture of Brown & Root and T. L. James, Inc.

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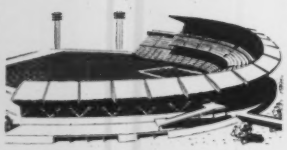
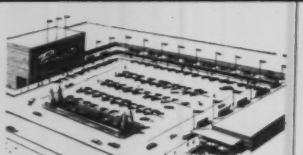
Overpasses



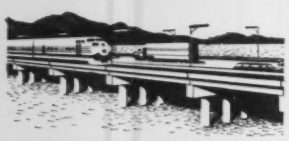
Stadiums

Parking Structures

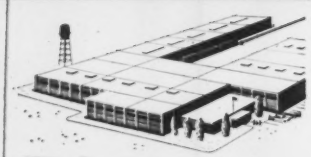
Schools



Shopping Centers



Bridges—Rail and Highway



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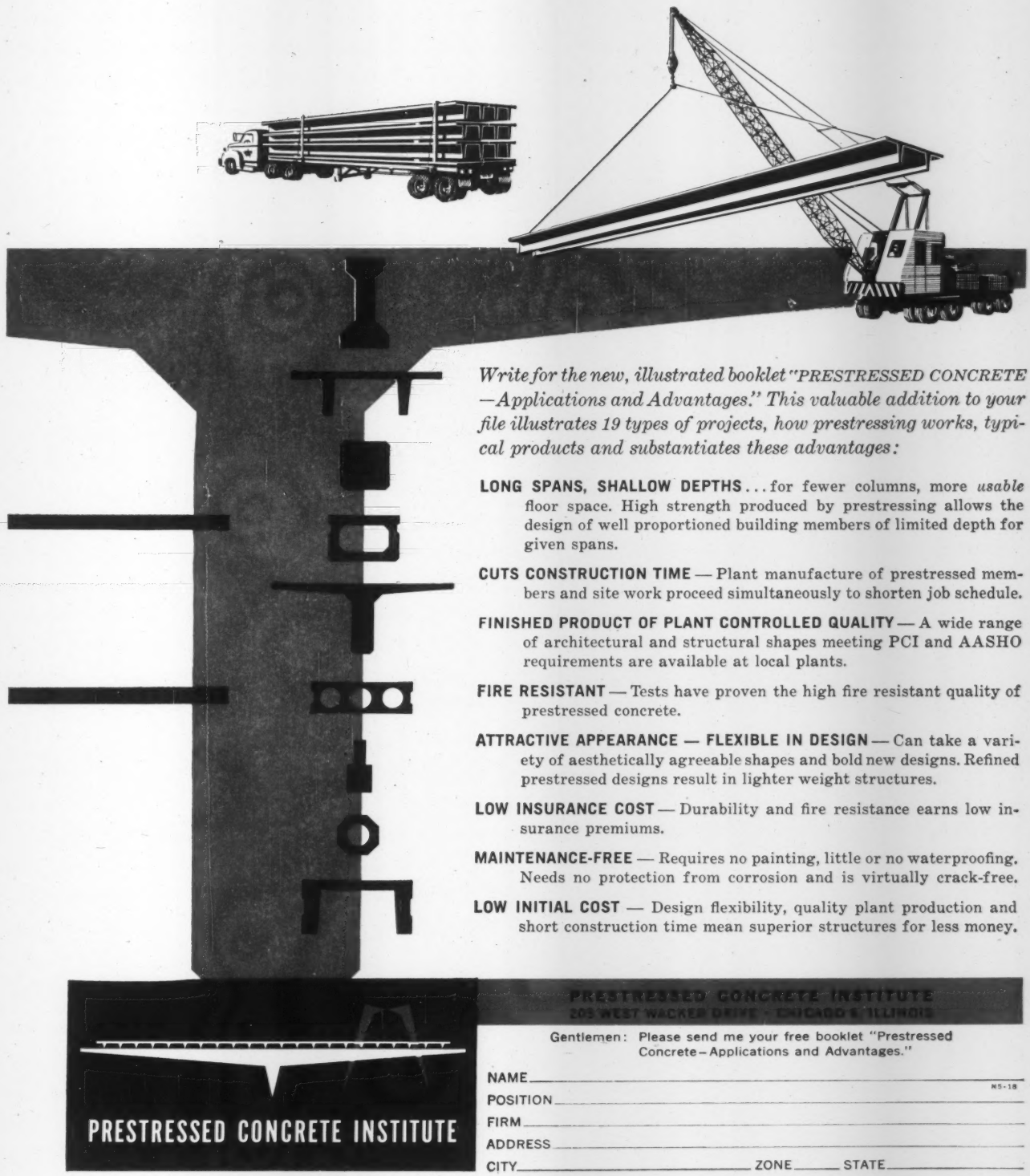

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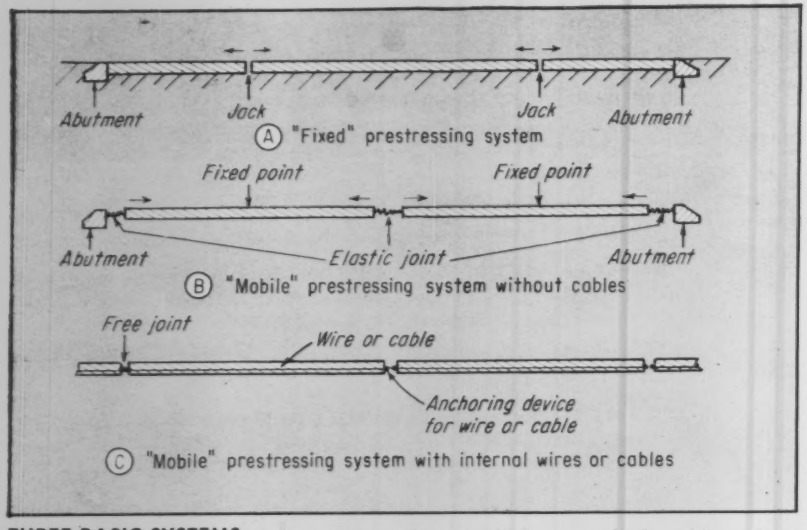
French Give Prestressed Roads



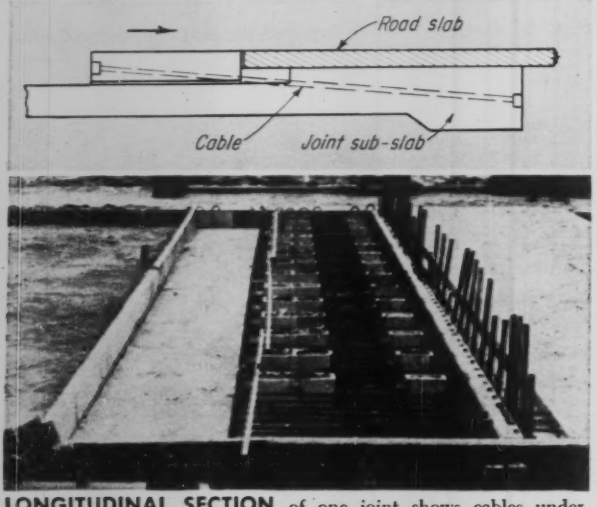
THREE BASIC SYSTEMS of prestressing used on test highway are fixed, mobile without cables, and mobile with cables (or wires).

French engineers are watching a 1.5-mile section of prestressed concrete road near Paris that represents probably the most ambitious attempt yet to explore the possibilities of this material for paving.

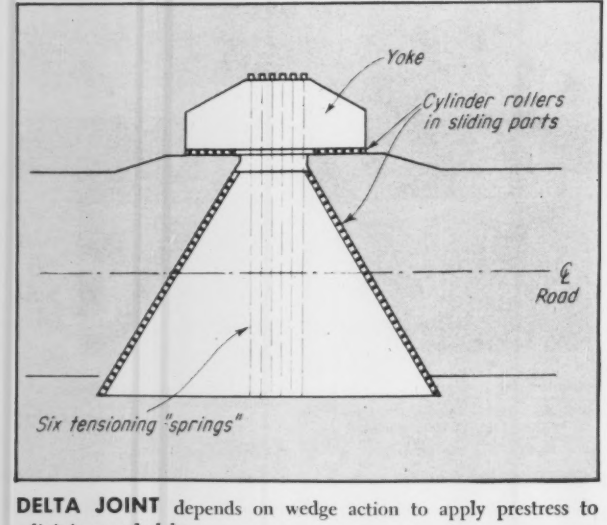
The experimental sections incorporate 11 different approaches for prestressing and three types of abutments. There are four separate sections, each built by a different contractor.

Motive, of course, is to save money. Experience in the year since the sections were completed has convinced the French that prestressed concrete has definite promise for road paving. Raymond Peltier, who heads the central laboratory of the National Highway Department, estimates savings of from 20 to 25% compared to conventional concrete.

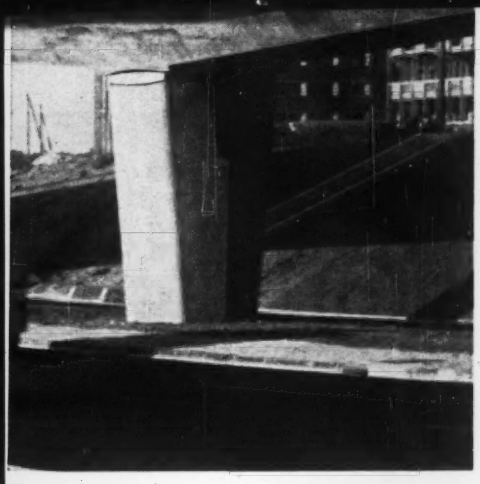
Big factor in cost reduction is the thinner slab made possible by prestressing. The French use slabs 9.8 in. thick



LONGITUDINAL SECTION of one joint shows cables under road slab. Joints and jacking emplacements are ready for stressing.



DELTA JOINT depends on wedge action to apply prestress to adjoining road slabs.



a Real Try

for heavy-duty roads. With prestressing, slab thickness can be as low as 4.7 in.

French engineers also believe that prestressed roads stand up better under heavy loads. (Legal maximum axle load is 14 tons, which is often exceeded.)

The experimental sections are part of a by-pass route. Profile is essentially flat, except for 2% grades adjacent to two overpasses. The prestressed concrete pavement comprises two tangent sections, 1,800 and 885 ft long and linked to one another and the main highway by 3,280-ft radius curves. An 18-in.-thick layer of fine sand supports the 24½-ft-wide roadway.

Section 1—Three basic prestressing schemes—"fixed," "mobile" without internal wires or cables and mobile with internal wires—are used in this 3,800-ft-long section (see Fig. 1).

The "fixed" system comprises a long slab and a fixed abutment at each end. Concrete is prestressed by jacks inserted at intervals in the slab. Minimum prestress in the concrete is about 400 psi, but can be as high as 1,800 psi in summer. The abutments must be very heavy to withstand thrusts up to 2,300 tons.

In a "mobile" system, the slab is broken up into a number of lengths with elastic joints between them or with prestressing cables inside the slabs. Minimum prestress for the mobile system is less than for the fixed, and thrust on the abutments is less.

Both transverse and longitudinal prestressing is employed. Slabs are 4.7 in. thick, except for the outer edges, which are 7.1 in. thick over a distance of 7.8 in.

The contractor cut costs by coating the transverse prestressing wires (25/64-in.-dia, high strength steel) with bitumen before placing the concrete. Wires are spaced 4 ft c-c. After the concrete hardened, technicians tensioned the wires with conventional jacks to 1,280 psi, setting up a prestress of 71 psi in the concrete. The bituminous coating functioned satisfactorily, permitting adequate wire slippage during tensioning.

About 1,600 ft of this section incorporates a mobile stressing system, with elastic joints to stress the slabs longitudinally. There are four slabs, longest of which is 520 ft, and three types of elastic joints, plus gravity abutments at each end of the section.

In the first elastic joint, the prestress is applied by cables that lie below the slab and force the joint against it (Figure 2). In the second joint, "springs" put pressure on the slabs that flank the joint. (The "springs" are actually steel bars put into compression by tensioning cables attached to the bars.) The third elastic joint is a "delta" type that applies thrust by a wedge-like action (Figure 3). Each of these joints applies a prestress of at least 284 psi to the concrete.

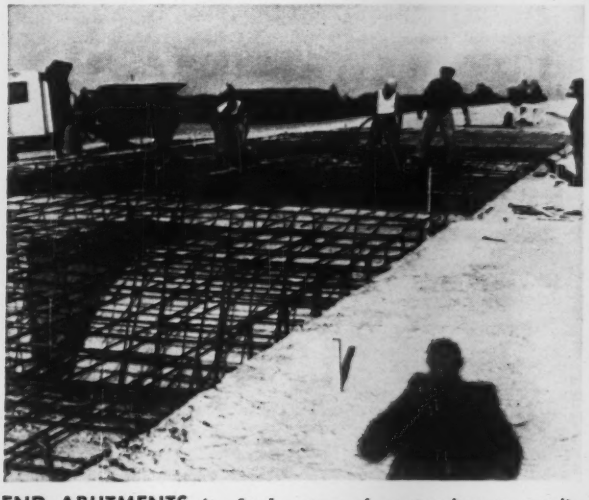
The portion of this section stressed by a fixed system is 1,640 ft long and contains four 322-ft slabs (the remaining 352 ft is accounted for by the abutments at either end). Joints between the slabs are simply blocks of concrete with steel guide pins running through them; at the joint face on one block, four slots accommodate flat hydraulic jacks. As stress is applied, shims are placed between the joint and the slab to hold the two apart and retain the stress. No grout is used and the jacks can re-apply stress as necessary. The section has a minimum prestress of 427 psi; but as the slabs expand in hot weather, stress may reach 1,707 psi.

Remainder of the first section is a single slab, 490 ft long and prestressed to 285 psi with internal cables. There are four cables in the slab, each made up of 12½-in. strands. Cable runs start at the mid-point of the slab and pass just inside the outer slab edge to a point a few feet from the end, where the strands fan out across half the width of the slab (see picture). With this cable arrangement, the entire slab is prestressed at one time from the mid-point.

Abutments for this section are all reinforced concrete, gravity type. To increase their resistance to movement, they are cast with large projections on the underside. The largest abutment is 217 ft long and weighs 15 tons.

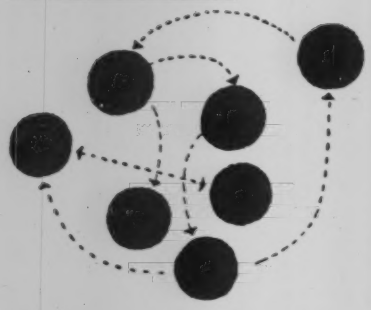
Section 2—The second section is 1,150 ft long, has three slabs 4.7 in. thick prestressed both ways with internal cables. To develop information on the acceptable lower limit of unit prestress, each slab has a different prestress. All longitudinal cables have the same total load

INTERNAL CABLES run along slab edges, fan out near slab ends to distribute prestress over half the slab width.



END ABUTMENTS for fixed system of prestressing are gravity type, heavily reinforced.

DOWN TO FUNDAMENTALS



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TWO-WAY PRESTRESS is achieved by longitudinal cables that run full length of slab plus transverse cables at closer spacings.

(35 tons); there are three cables in one slab, four in another and five in the third for unit stresses of 152, 201 and 253 psi respectively. Transverse prestress also differs in the three slabs.

The contractor developed a special joint composed of three I-beam sections with neoprene honeycomb forced into the joint on either side of the center beam. The joint applies a prestress up to 113 psi; for that reason, and even though it is a "mobile" system, end abutments are needed. This joint proved unsatisfactory in service because the neoprene extruded and the joint lost its elasticity.

Section 3—Third section uses a mobile prestressing system with four full-length slabs and a half-slab at each end for a total length of 1,150 ft. Slabs are not prestressed transversely and are 5.9 in. thick.

The section incorporates a sawed, weakened plane joint with dowel bars at mid-length.

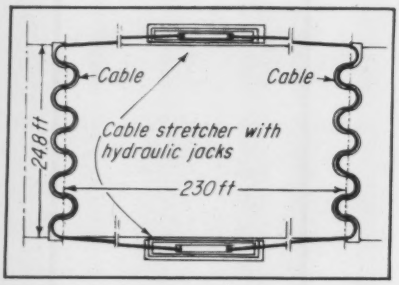
Two other types of elastic joints are installed in this section. They are Jeuffroy and pneumatic joints.

In the Jeuffroy joint, mating slab ends are scalloped in half-circles (Figure 4). A 1⅛-in. cable passes through the joint and along the edges of the slab to tensioning jacks on either side at mid-length of the slab. The joints work in pairs, one at each end of the slab.

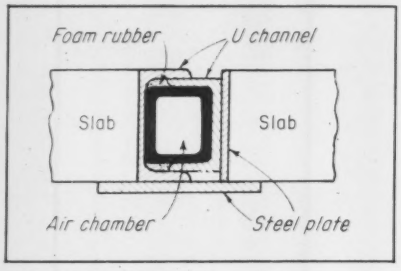
The section has three pneumatic joints. Each consists of a rubber air chamber with 0.4-in. wall thickness enclosed in a box made up of two steel U-shapes that slide within one another (Figure 5). Air pressure in the joints varies from 284 to 568 psi.

The pneumatic joints are simple and inexpensive. They make it easy to prestress the slab at a low value while the concrete is still "green" (to prevent shrinkage cracks) then step up the stress after curing. Stressing can be controlled closely. The joint is elastic and yet relatively insensitive to temperature changes.

The joints are designed to handle



JEUFFROY JOINT has cables around each end tensioned from both sides of slab.

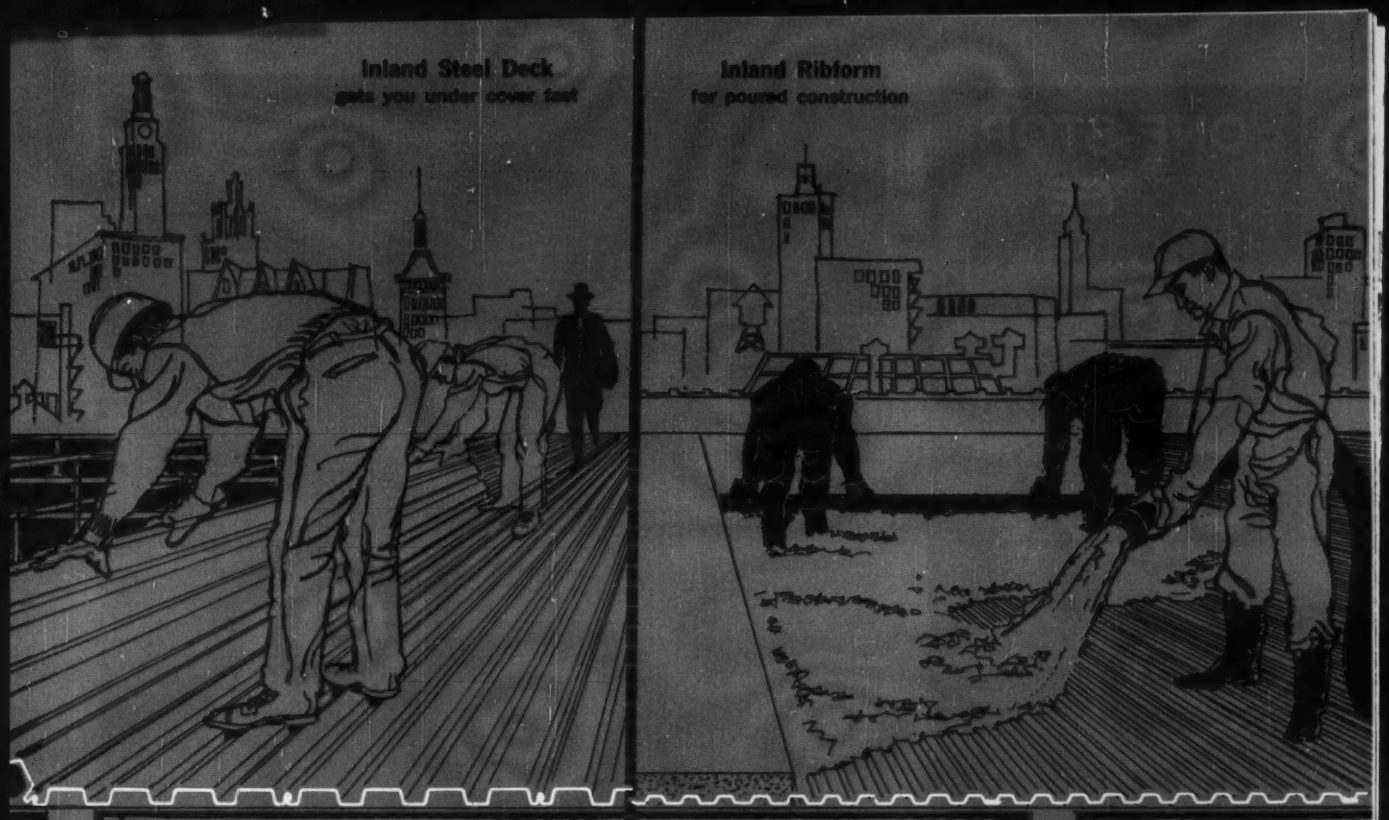


PNEUMATIC JOINT uses air in rubber chamber to apply prestress.

"flats" in the rubber air chambers, should they occur. Each joint is divided into two long compartments, each extending across one-half the width of the slab. Should the air chamber in one-half the joint go flat, the other half-joint would still keep enough load on the slab (except perhaps in very cold weather) to permit changing the damaged chamber without interruption to traffic.

Section 4—The fourth section has variations of the mobile prestressing systems used in the other sections.

One portion has two 170-ft slabs prestressed internally. One of the slabs has cables (nine 9/32-in. strands) laid in a diamond pattern; the cables lie at an angle of 35 degrees with the longitudinal axis. The other has 13/32-in. wires in a 30-deg diamond pattern. Prestress varies from 142 psi at the slab



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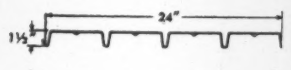
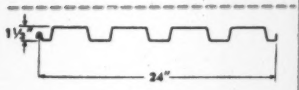
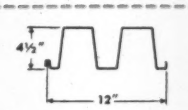


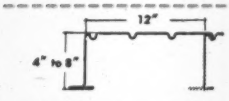
A-DECK — For purlin spacings not exceeding 8'4". Narrow ribs provide deck surface that supports the thinnest or softest types of insulation.



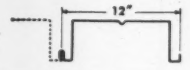
B-DECK — For spans to 10'0". Wide rib distributes metal for greater structural efficiency. Well suited for use as side wall panels.



C-DECK—Carries normal roof loads over spans up to 24'0". Used extensively in canopies.

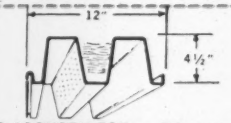


T-STEEL — New! Galvanized only. For clear spans to 32'0". Adaptable to acoustical and flush, luminous ceiling treatments. Provides superior diaphragm to resist seismic and wind loads.



H-DECK — New! For simple spans to 20'0" — 3" and 4½" depths. Especially practical to cover walkways in shopping centers, schools, other installations.

B-ACOUSTIDECK — Two-in-one panel combines steel roof deck with acoustical ceiling having Noise-Reduction Coefficient of .70. Used for spans to 10'0".



C-ACOUSTIDECK — Offers same Noise-Reduction Coefficient as B-Acoustideck. Can be used for spans to 24'0".

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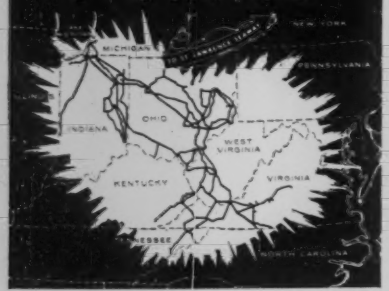

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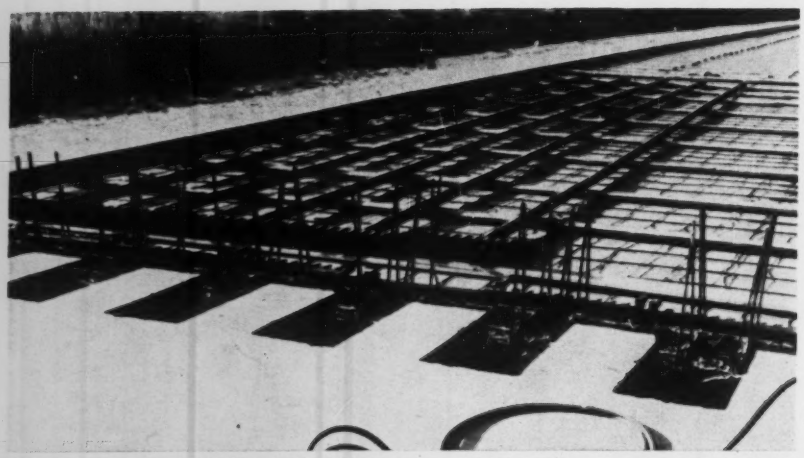
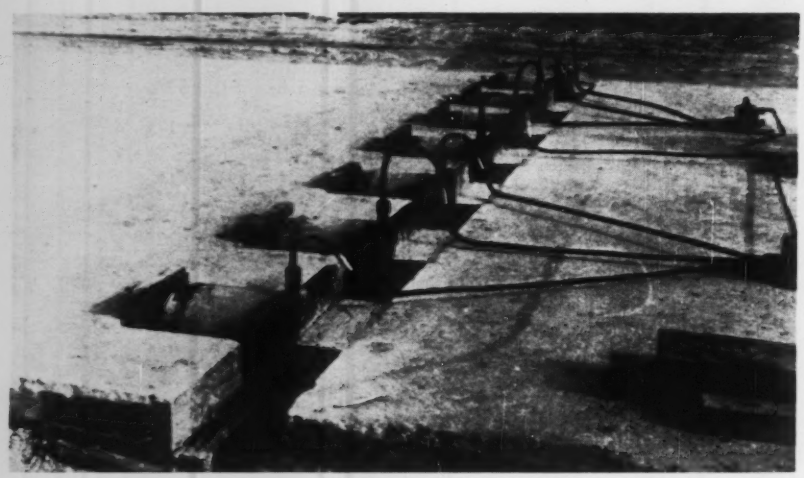


TENSION-COMPRESSION JOINTS are at end of slab ready for casting and stressing.



HYDRAULIC JACKS in temporary joints at midspan stress slab.

end to 341 psi at the mid-point; transverse prestress is constant at 114 psi along the length of the slab. Basic slab thickness is 4.7 in., increasing to 7.8 in. at the edges.

The remainder of this section is prestressed externally. One 656-ft length has a pneumatic joint at the center; the other, 640 ft long, has tension-compression joints at both ends.

For the 656-ft length, slab thickness is 5.9 in. and the slab is stressed transversely with 13/32-in. wires over half its length. Part of the remaining half has a sawed longitudinal joint; remainder has distributed steel reinforcing. The pneumatic joint has a different design, but the same operating principle, as the pneumatic joints of the third section. There are two chambers housed in cast steel and inflated with nitrogen. Play in the joint can be as much as 2.7 in., with prestress applied up to 570 psi.

The 640-ft slab has transverse prestress over its entire length and is 4.7 in. thick. Transverse wires (bituminized to prevent bond) are 13/32 in. dia spaced 2½ ft c-c. They were tensioned at different loads to give 114 psi over half the length and 85 psi over the balance.

The contractor installed tension-compression joints at each end of the slab. Tensioning was by hydraulic jacks from a temporary joint at midlength of the slab. Prestress is 427 psi.

Observations—After nearly a year of observation of test sections, Mr. Peltier feels the most promising to be a fixed system without transverse prestressing.

No such section is under test. However, the third section (the only one without transverse prestress) has demonstrated that a 5.9-in. thick slab can handle transverse stresses without prestressing. And the fixed system is the least expensive of the various longitudinal prestressing systems.

The contractor who installed the fixed system on the test road estimates its cost on a large project to be about 70% that of a conventional concrete pavement 10 in. thick.

The French may build a 6.25-mile section next year to explore the method further.

TELEPHONE COMPANY BUILDING

SUBSTRUCTURE AWARDED TO SPENCER, WHITE & PRENTIS

Engineers: Moran, Proctor, Mueser & Rutledge, New York City
Architects: Voorhees Walker Smith Smith & Haines, New York City
Foundation Contractor: Spencer, White & Prentis, Inc., New York City

Spencer, White & Prentis is foundation contractor for one of the largest buildings ever put up by the New York Telephone Company

The above-pictured 200x330 ft. foundation—on which Spencer, White & Prentis was successful bidder— entailed many kinds of substructural work. General excavation, horizontal wood sheeting, piers to sound rock, concrete pressure slab, concreting of walls, drilling of deep wells in rock —these were some of the operations performed.

Note that the sheeting system has no raker bracing. Support was provided by Pretest wire tie-backs on exterior side. This new method, recently developed by our engineers, leaves the excavation free and clear.

Whether it's the over-all substructure, as on this job—or the specialized operations of foundation and underpinning work—you can count on Spencer, White & Prentis for dependable service backed by more than 40 years experience.

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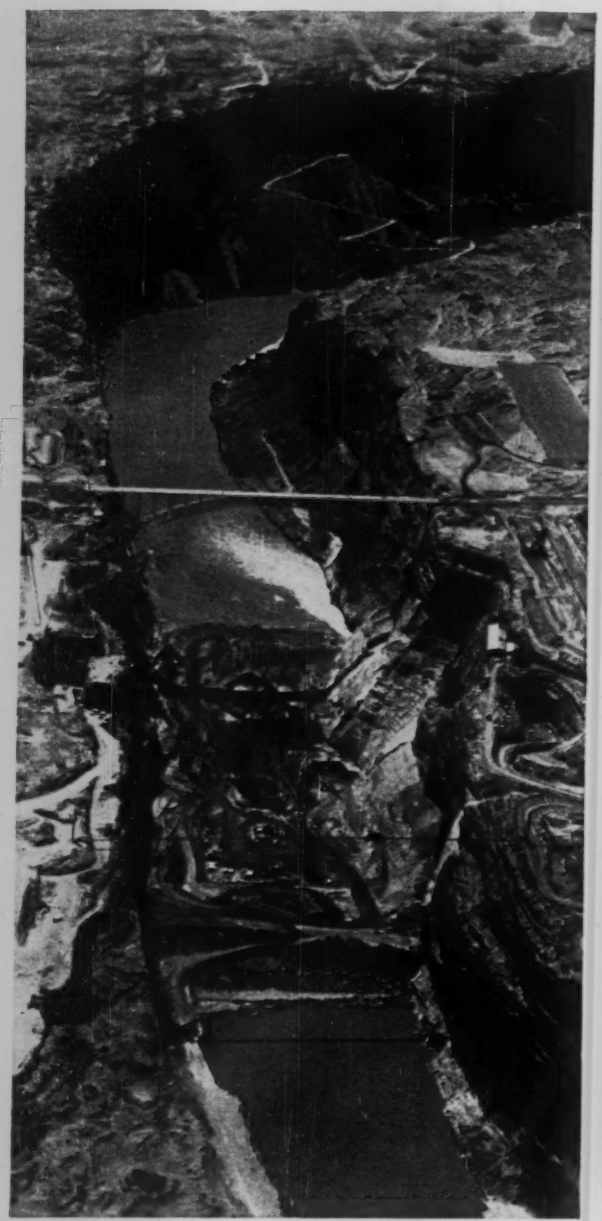
New Construction Idea News

How COMMERCIAL Ribs Support All Five



U. S. BUREAU OF RECLAMATION PHOTO FROM UPI

COLORADO RIVER DISAPPEARS as flow is diverted through tunnel in west canyon wall where dam will soon start to rise in the 700 ft. gorge of the Colorado River. Glen Canyon Dam is a $325,000,000 Bureau of Reclamation project including a 900,000 kw hydroelectric power plant. It will create an upstream reservoir 186 miles long to infuse vigor and productivity into arid wasteland.

WIDEST BORE EVER SUPPORTED with steel required heaviest tunnel ribs ever bent in quantity. Portals of spillway tunnels are 113 ft. wide, over 80 ft. high at crown. Bore gradually changes to circular 63 ft. diameter. COMMERCIAL engineered and produced all ribs...design involved solving of ever-changing curves...fabrication included multi-curvature bending of 14" WF beams @ 167#/ft. for roof support at transition and 12" WF beams @ 72#/ft. for circular section. Solved was one of the most difficult tunnel support jobs ever undertaken.

(Advertisement)

Glen Canyon Tunnels

Glen Canyon Dam — Merritt-Chapman & Scott Corp., Prime Contractor
Access Tunnel — Frazier-Davis Construction Co., and Gibson-Roberts Construction Co., Tunnel Contractors
Left Spillway Tunnel—Frazier-Davis Construction Co., Tunnel Contractor
Right Spillway Tunnel — Northwood, Inc., Tunnel Contractor
Left Diversion Tunnel—Frazier-Davis Construction Co., Tunnel Contractor
Right Diversion Tunnel—Mountain States Construction Co., Prime Contractor

COMMERCIAL steel ribs and posts—unanimous choice of the four tunnel contractors—provide support for access, diversion and spillway tunnels for Glen Canyon Dam project...scheduled completion 1964.

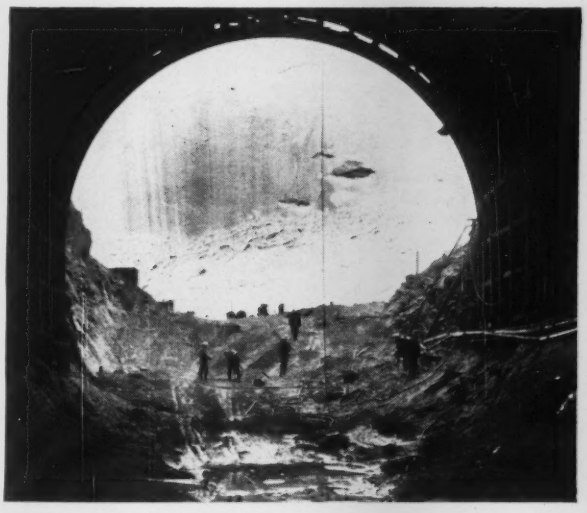
Working with the Bureau of Reclamation, COMMERCIAL designed and fabricated steel sets which proved to be the solution for supporting these rock tunnels. All were of unusual size, length and roof profile and were constructed under difficult working conditions.

In general: Working conditions in all five tunnels demanded that complete support units be accurately fabricated for easy, fast field erection. The two diversion tunnels, two spillway tunnels and the access tunnel totaled close to 17,000 ft. of tunnel. Delivery schedules were timed to tie in with job progress target dates in the tunnel headings.

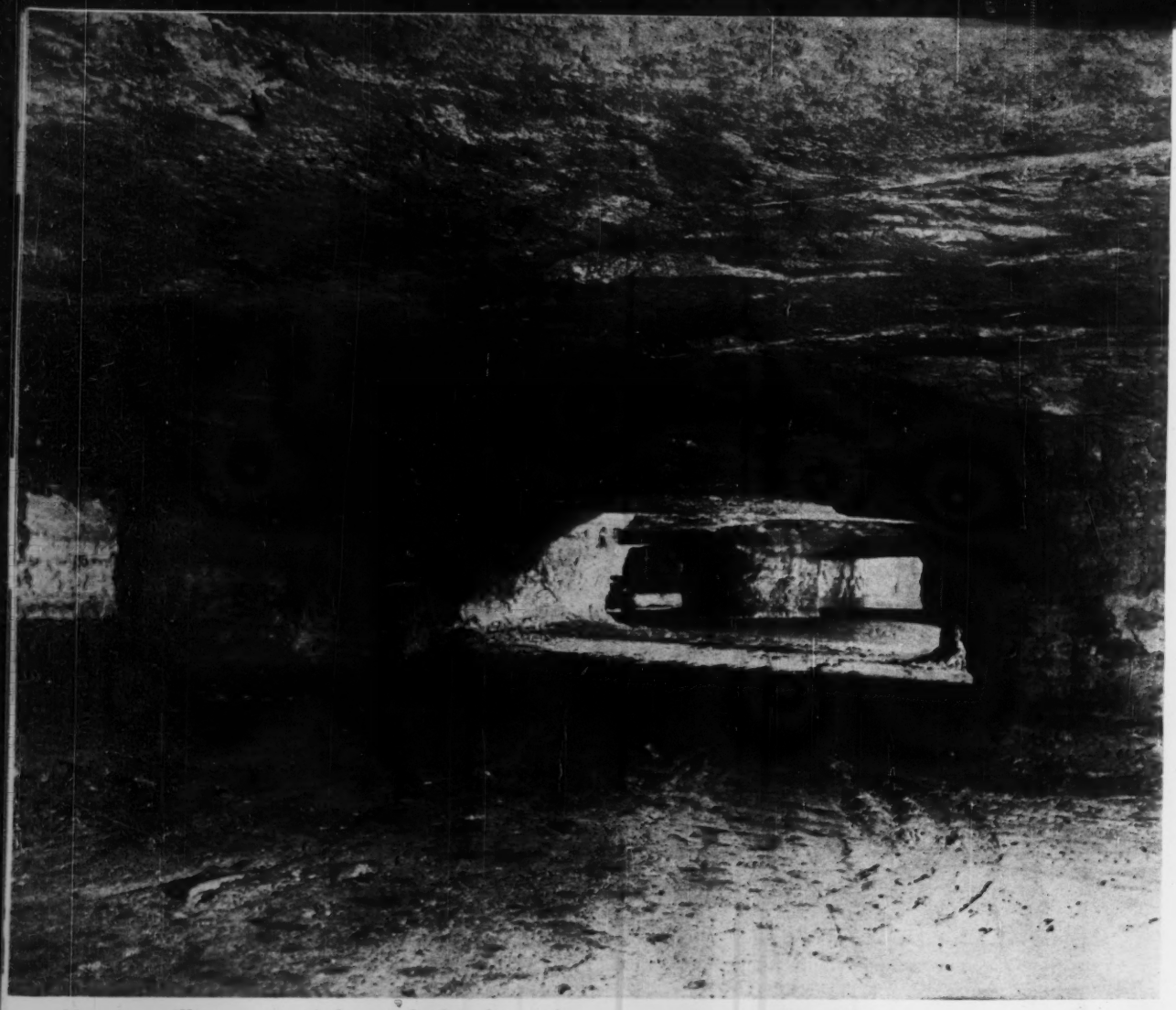
In particular: COMMERCIAL solved the extremely difficult task of supporting the multi-profiled transition sections of the spillway tunnels. The problem of size was complicated by the changing elevation and shape of the transitions. At the portal the section was the rectangle of the open cut surmounted by the arch of the tunnel roof. This shape varied continuously toward the smaller and circular cross section of the tunnel to which the transition joins. In addition, the elevation of the roof, spring and flow lines was ever-changing throughout this section and each line's elevation was different. COMMERCIAL had to design supports to fit three exponential curves — each a different formula.

Complete details of COMMERCIAL's contribution in supporting the spillway tunnels for this U. S. Bureau of Reclamation project are available to you. If you have a challenge involving support for a shaft, surface or sub-surface tunnel—hard or soft ground—engineering counsel, based on more than 30 years of experience, is yours for the asking. Address: Commercial Shearing & Stamping Company, Dept. E-20, Youngstown 1, Ohio.

11,000 FT.—8% GRADE ROADWAY—all in tunnel in the canyon wall with tunnel windows every 1,000 ft.—leads to base of dam and will provide access to future powerhouse. Bore: over 20 ft. wide, 22½ ft. high arched roof. Supports: 4-piece rib and post sets, 8" WF beams @ 31#/ft. set on 4 ft. centers.



TWO DIVERSION TUNNELS each over half mile long, aided by cofferdams, sidetrack the Colorado to allow dam construction. Downstream sections later will be joined with plunging spillway tunnels to handle flash flood overflow. Arch: 21' 10" above and 43' 2" wide at spring line. Finished concrete lining: 41' diameter. Steel supports: 6-piece sets spaced on 4 ft. centers. Ribs and posts: 10" WF @ 45#/ft. supported on double 8"I @ 18.4#/ft. wall beams.



Massive pillars support the roof of industrial cave near Kansas City, Mo.

Building Underground: Factories

Abandoned quarries in the limestone rock underlying the Kansas City, Mo., area have become popular sites for industry. Developed and partitioned, the caves have uses ranging from storage space to manufacturing, from professional offices to recreational facilities. One tremendous (160-acre) quarry development even contains a clubhouse for underground trout fishermen.

There are solid reasons for industry's descent into the caves, apart from their value as bomb shelters. Among them:

- Construction cost, one-half to two-thirds of that for a building enclosing the same space above ground.
- Low rentals, generally dependent on construction costs.
- Low fire insurance, since the caves are classed as fireproof.
- Constant temperature and humidity.

Typical of the many caves in the area is the J. G. Nichols Co. underground industrial park. The site is an old rock quarry located about 10 miles from downtown Kansas City. The Nichols Co., designer-builder as well as owner, has converted the 12-acre underground area into office, manufacturing and storage space designed for the individual needs of five tenants.

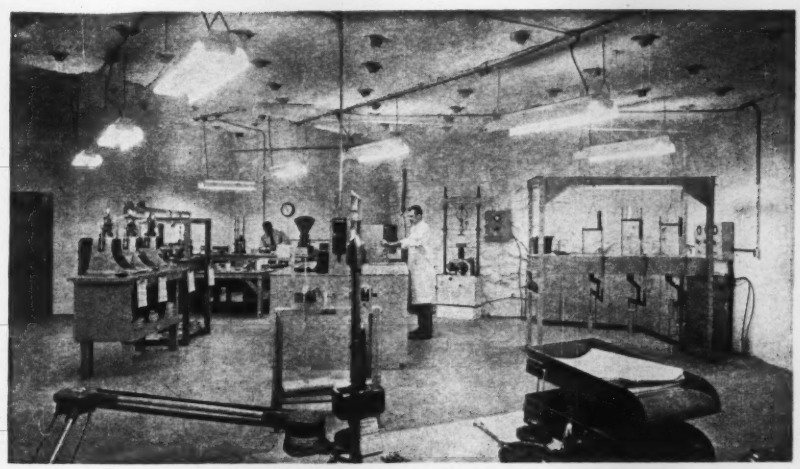
Natural year-round temperature in the Nichols cave remains at 52 F; relative humidity stays at 75%. This benefits each of the cave's tenants, though for different reasons.

The Epic Manufacturing Co. finds the underground atmosphere good for controlling thermal expansion and contraction of its products during fabrication, thereby removing a handicap to its toolmaking business. Woodward, Clyde, Sherard & Associates, consulting soils and foundations engineers—find the constant temperature and humidity conducive to accurate soil testing. A cooling-equipment company and a toy firm find comfortable working conditions.

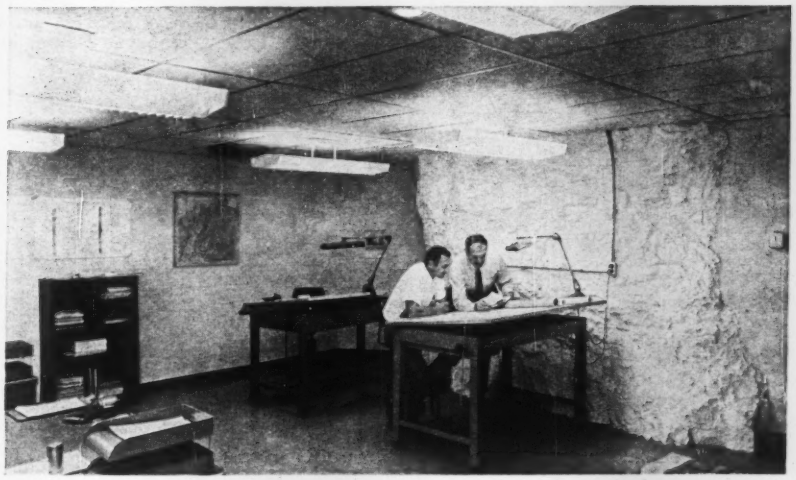
- **Cave construction**—The cave structure left after the quarrying operations looks like clumsy flat-slab framing. Huge natural limestone pillars, spaced about 25 to 30 ft apart, support the cave roof.

Height to the ground surface varies from 50 to 80 ft above the cave ceiling. Over the 4-ft limestone stratum forming the cave ceiling is a 10-ft layer of shale, topped by a "Winterset Ledge," another limestone stratum 37 ft thick. Above this limestone is yellow clay.

Only one of the five former cave entrances remains open for trucks. Four lanes (two entrance and two exit) fan out from this main truck entrance.



Testing laboratory has unfinished ceiling.



Office areas have suspended ceilings.

and Offices in a Cave

Before partitioning the space for tenants, Nichols engineers reinforced the cave ceiling with roof bolting. In some areas they used expansion bolts, 1 in. in dia and 18 ft long, inserted into holes drilled perpendicular to the ceiling surface. The bolts were tightened against washer plates 8 in. square by ¼ in. thick, which bear against the rock. The long expansion bolts extend through the shale into the Winterset Ledge.

For some areas, however, the engineers specified shorter expansion bolts, ⅞ in. in diameter and 3 ft long, inserted at angles of 30 to 45 deg with the ceiling surface. These bolts compress the ceiling rock, binding the limestone layers like a laminated beam.

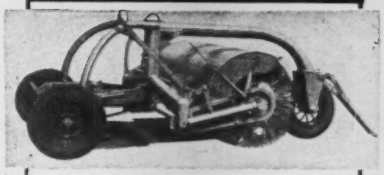
Walls enclosing each tenant's space are concrete block, built from floor to ceiling. Interior wood stud partitions are anchored to wood plugs driven into holes in the cave ceiling. Lighting fixtures and drop ceilings are suspended from ¼ in. expansion shields with lead cylinder cones driven into the rock.

• **Heating and air handling**—A gas-fired hot-water boiler supplies heat to coil heating units in each tenant area. There, individually controlled blowers maintain desired temperatures ranging from 65 F to 75 F.

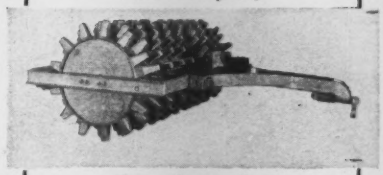
Air forced through the peripheral, undeveloped regions of the cave controls the humidity. Cold, dry winter air is warmed to 52F, and warm, moist summer air is cooled and dehumidified.

Exhaust fans located near the truck entrance draw the air through the natural air corridor at the cave perimeter. Tenants' space is maintained at air pressures slightly above atmospheric to minimize drafts.

Grace
ASPHALT AND COMPACTION EQUIPMENT

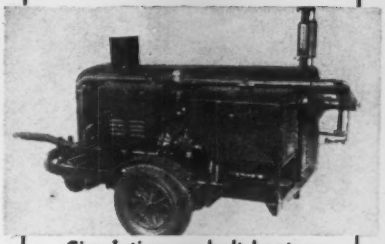


Roadsweepers,

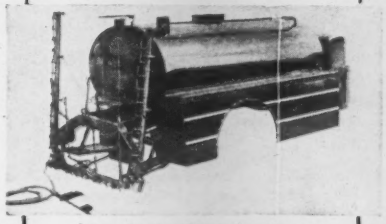


Sheepsfoot rollers

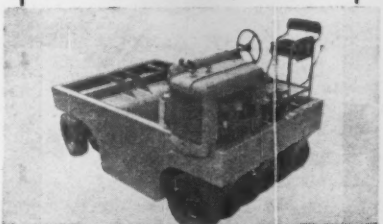
Chip spreaders



Circulating asphalt heaters



Asphalt Distributors



Pneumatic rollers, self-propelled or trailed

W. E. GRACE MFG. CO.
6015 S. Lamar St., Dallas, Tex.

$12-million shopping center has . . .

Six Acres of Folded-Plate Roof

A $12-million shopping center in Omaha sports a folded-plate roof of 4-in.-thick reinforced concrete spanning 60 ft and walls on which patterns have been put in terrazzo for architectural effect.

It is Cross Roads Shopping Center, two three-story department stores faced in the decorative concrete and connected by a 550-ft-long arcade roofed with the folded plate.

The roof is a continuous, two element folded-plate structure on concrete columns spaced 60 ft by 22 ft 8 in. It extends over four 60-ft spans and cantilevers 10 ft beyond at each end.

Each bay has a 6-ft rise and 22-ft 8-in. chord. The expansion joint at the ridge extends transversely across the roof at its center.

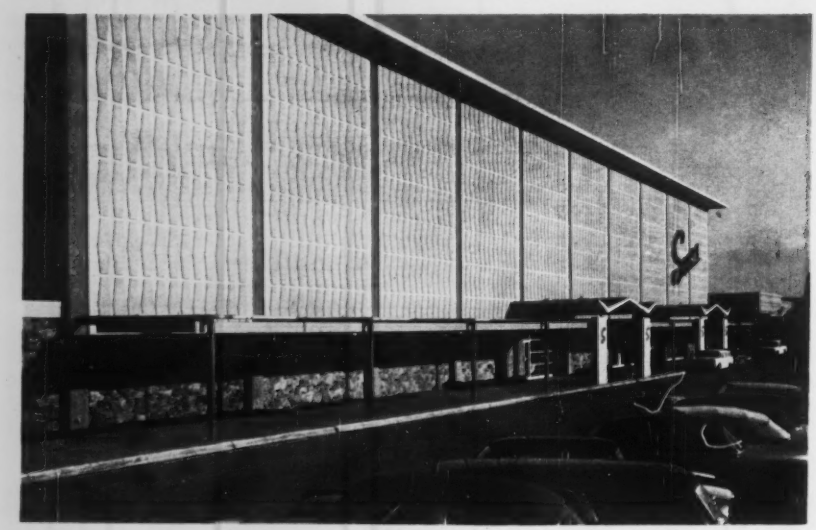
The whole folded-plate roof is 550 x 260 ft, ranking as one of the largest roofs. Yet Peter Kiewit Sons' Co. of Omaha built it in under three months.

• **Speedy work on the roof**—Reuse of forms was one key to the speed. Four sets of forms were used an average of eight times each. Carpenter crews built them in 16 x 22-ft rigid units. Erection crews hoisted and lowered them with fork-lift trucks.

The 16 x 22-ft sections of forms were supported on four timber trusses spaced 5 ft. c-c. The trusses carried 4x4-in. purlins spaced 2 ft c-c, and the purlins, in turn, supported the plywood

(Continued on p. 63)

FOLDED PLATE is reinforced concrete 4 in. thick, spanning 60 ft between columns.



DECORATIVE WALLS have polished terrazzo lozenges on precast concrete.

P. H. Van Orden, President, C. L. Peterson, Vice-President and Treasurer, and R. H. Webb, Foreman of the Van Orden Company, Contractors, of Grand Rapids, Mich., supervise the installation of "K&M"® Asbestos-Cement Sewer Pipe at Paw Paw, Mich.

10,000 FT. OF SEWER PIPE LAID...

. . . not enough infiltration to measure

Read how the Van Orden Company solved the problems of installation and of infiltration when pipe had to be laid 9 ft. below the water table.

"the ease of handling and assembly saved us dollars and time!"

P. H. Van Orden

"Construction of the Paw Paw trunk sanitary sewer called for installation of pipe at depths up to 19 feet, where water table was at 10 feet. Infiltration had been the major problem in other sewer installations in the area. We solved this problem by using "K&M" Asbestos-Cement Sewer Pipe with its FLUID-TITE joint. With 10,000 feet of sewer in, we haven't had enough infiltration to measure.

"The longer laying lengths and the speed with which a joint can be made are definite time-saving factors, which have added to our production. Less time spent grading pipe and handling material means dollars saved."

Rigorous tests prove "K&M" Asbestos-Cement Sewer Pipe is infiltration-tight at 25 psi . . . a pressure equivalent to that of a 58-foot head of water.

"K&M" Asbestos-Cement Sewer Pipe wont rust, rot, or corrode. Its smooth bore remains clean, permanently. Flatter grades are possible. Fewer lift stations are required.

Maintenance-wise, the village of Paw Paw, Mich., will enjoy tax savings. "K&M" Asbestos-Cement Sewer Pipe is practically indestructible. Requires fewer inspections, because root growths do not penetrate the exclusive FLUID-TITE coupling.

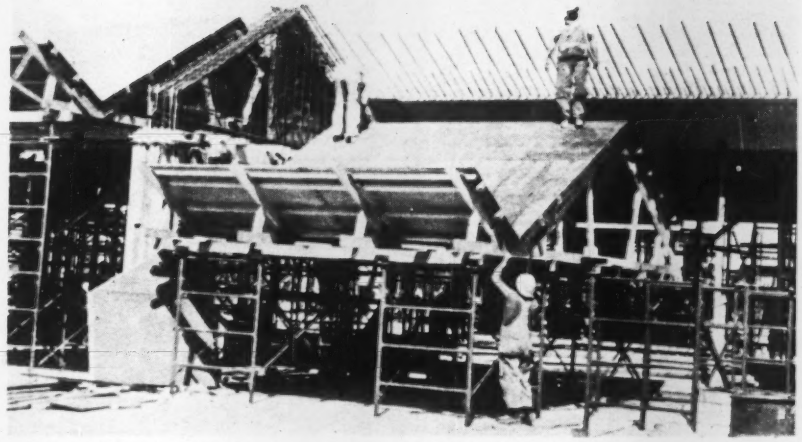
Write today for more information on "K&M" Asbestos-Cement Sewer Pipe to: Keasbey & Mattison Company, Ambler, Pa.

Keasbey & Mattison at Ambler

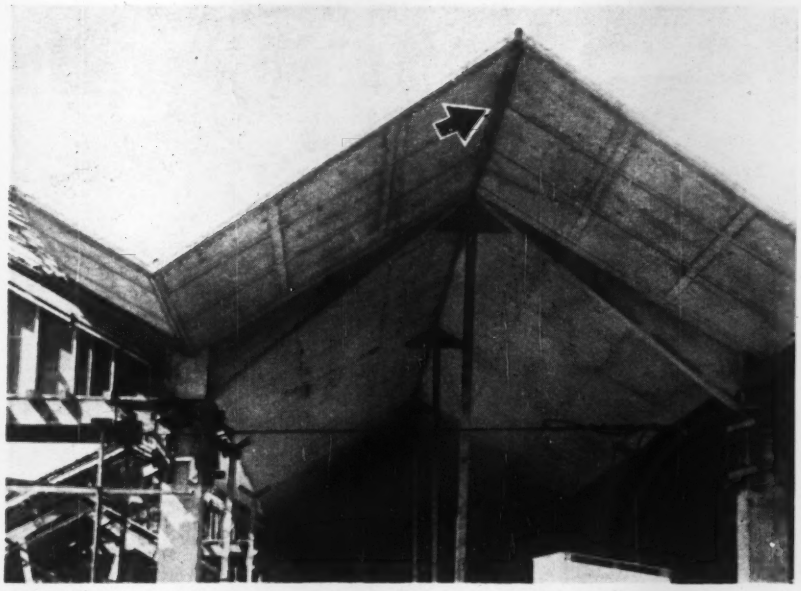
K·M BEST IN ASBESTOS

Two-step assembly! Lubricate the tapered end of "K&M" Asbestos-Cement Sewer Pipe, then slide it into the exclusive, patented "K&M" FLUID-TITE® Coupling

Light weight reduces shipping and handling costs, saves on installation time. At the same time, there's a minimum of wastage and breakage on the job with tough "K&M" Asbestos-Cement Sewer Pipe



TIMBER FORMS, in 16x22-ft units, were used eight times for the folded plate roof.



EXPANSION JOINT (arrow) was the starting point for folded-plate construction.

forms for the roof slabs. The trusses rested on tubular scaffolding.

Workmen erected the forms, leaving a 4-ft space between adjoining sections. These areas were closed with plywood sheets. The plywood was supported on 6-ft length of 4x4-in. timbers seated on the top chords of the end trusses of the sectional forms.

In dismantling the forms after the concrete had cured, the contractor removed the 4x4's first. The plywood sheets dropped out and temporary timber shoring was installed prior to lowering of the large form sections.

• **Fancy work on the walls**—The three-story building at one end of the arcade has a reinforced concrete. It is a Sears Store with 175,000 sq ft of floor area (flat-plate construction). Its 40,000 sq ft of exterior walls are covered with two types of decorative materials.

The front wall is covered with precast terrazzo panels 5 ft wide by 8 ft high. Each panel contains six raised lozenge-shaped designs.

The other walls are covered with rectangular concrete panels with posed aggregate. This type of panel also is used to enclose part of the arcade.

Some exterior walls in the project are precast concrete grilles with lozenge-shaped openings.

The other building, called the Brandeis Store, has a total floor area of 190,000 sq ft on two-way waffle slabs. Its exterior walls are principally of glazed brick.

Leo A. Daly Co., Omaha was architect-engineer for the Brandeis Store and arcade. Architect-engineer for the Sears Store was George L. Dahl, Dallas, Tex., with Daly Co. as associate.

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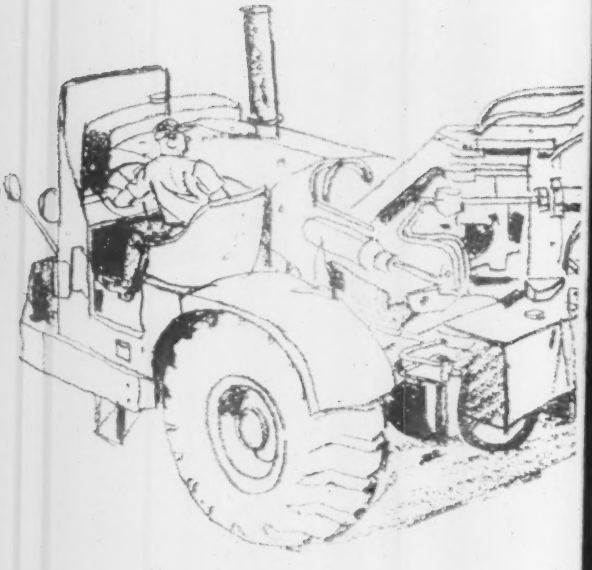
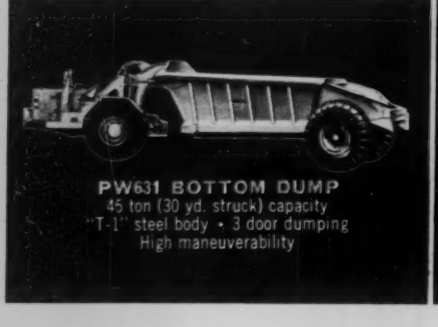
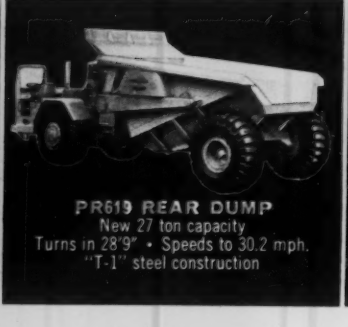


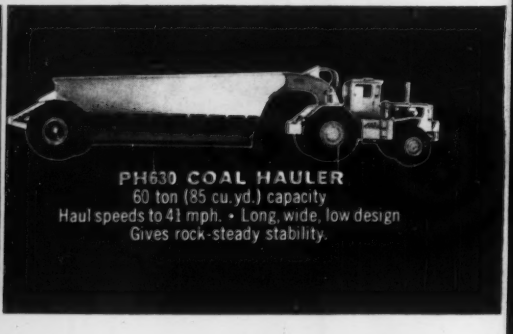
6 NEW ATHEY TRAILERS . . . bonus



PW631 BOTTOM DUMP
45 ton (30 yd. struck) capacity
"T-1" steel body • 3 door dumping
High maneuverability



PR619 REAR DUMP
New 27 ton capacity
Turns in 28'9" • Speeds to 30.2 mph.
"T-1" steel construction



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60 ton (85 cu.yd.) capacity
Haul speeds to 41 mph. • Long, wide, low design
Gives rock-steady stability.

Each new Athey trailer is designed and built to give better performance than comparable sized units. Pound for pound they're tougher, stronger and built to do a man-sized job.

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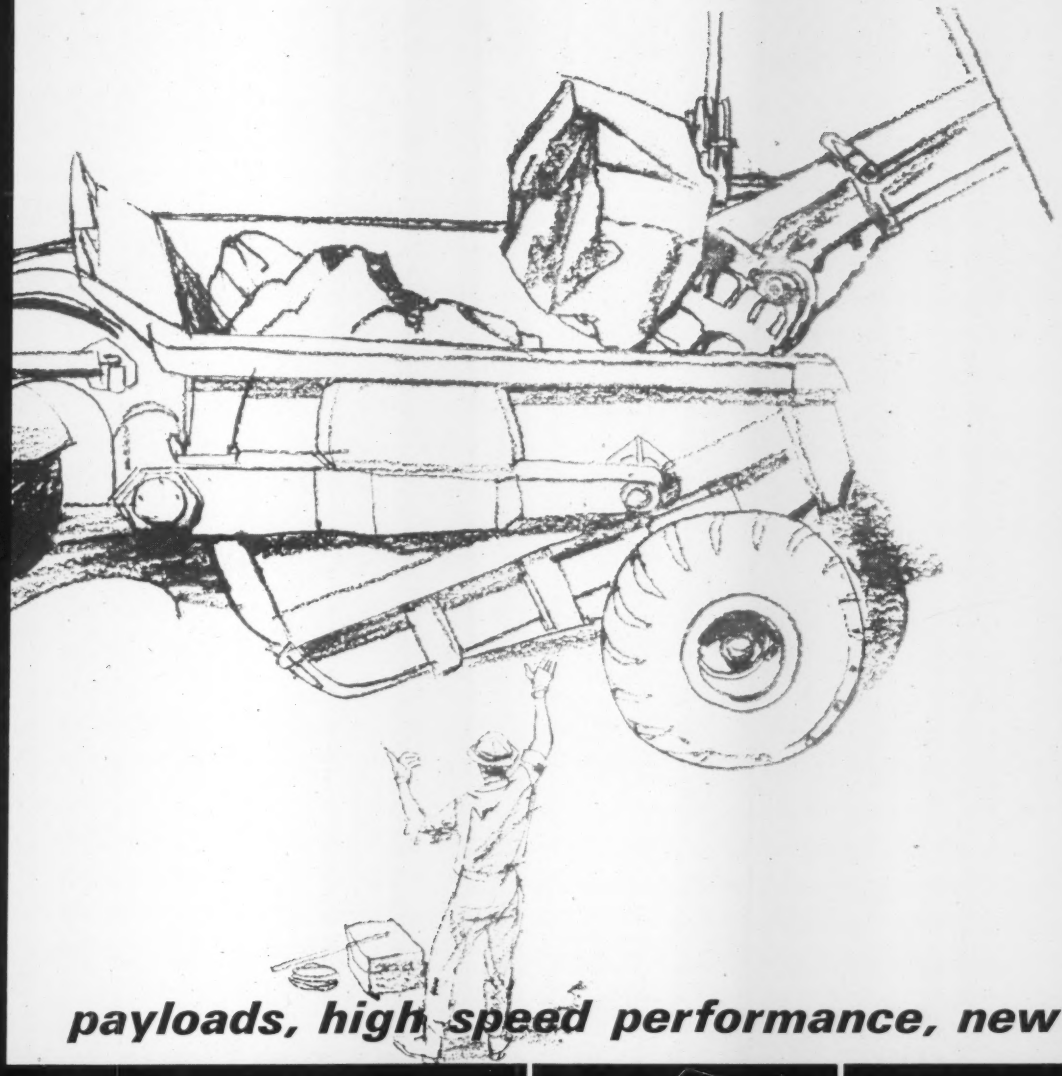
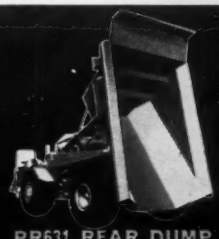
That's not all. New Caterpillar* 630 and 631 Tractors have 420 horsepower and power shift transmissions. 9 speeds with 3 shifts and no clutch! Power to spare!



payloads, high speed performance, new power!

PW630 BOTTOM DUMP
48 ton (32 yd. struck) capacity
3 door dumping • "T-1" steel body
Speeds to 41 mph.



PR631 REAR DUMP
40 ton capacity
"T-1" steel body • Turns in 34'
Speeds to 31 mph.

PR630 REAR DUMP
40 ton capacity
Speeds to 41 mph. • "T-1" steel body
Excellent roadability

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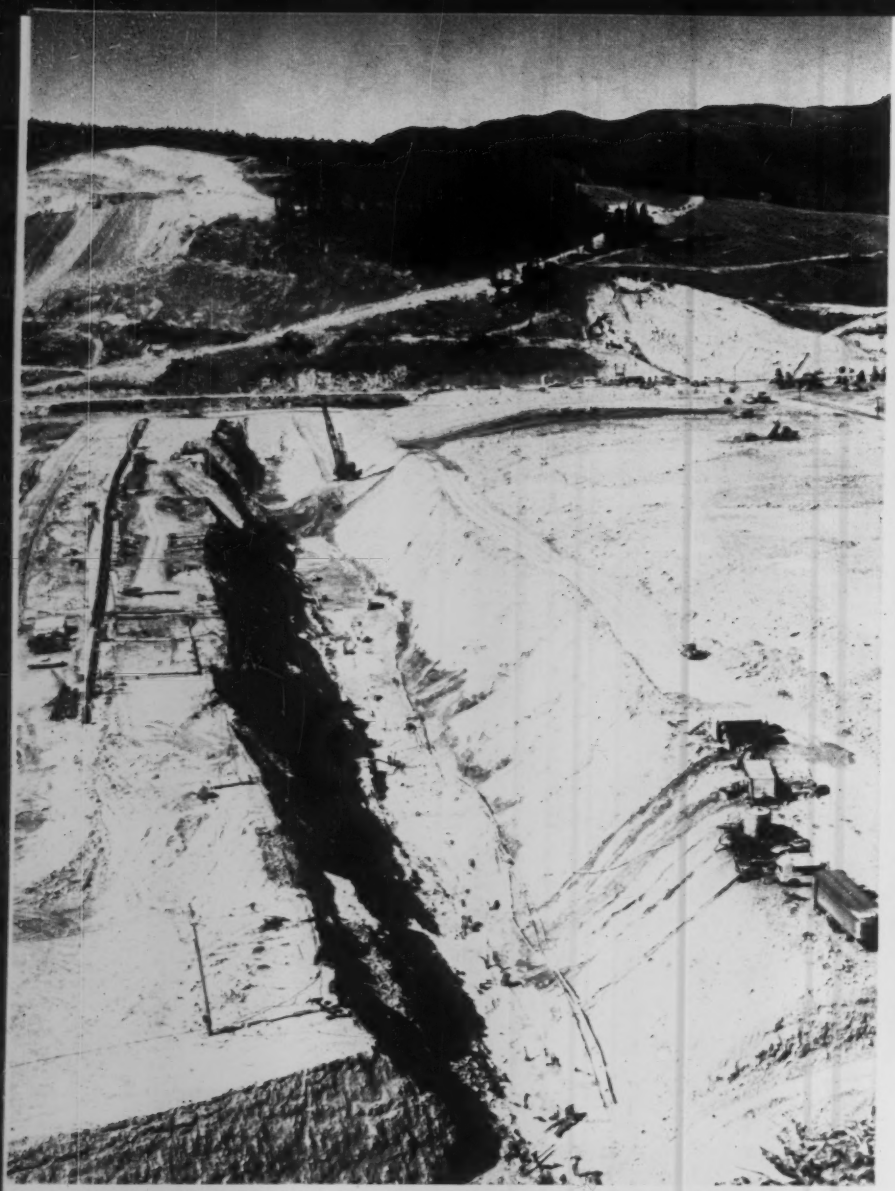
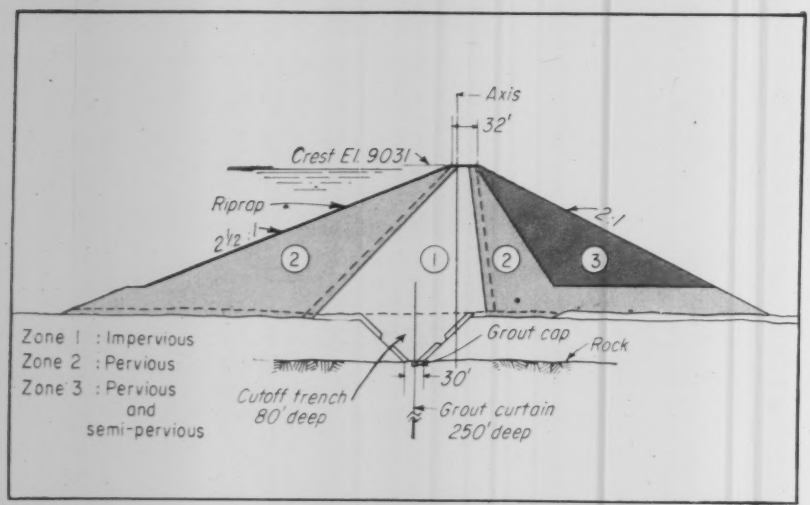


CUTOFF TRENCH, 80 ft deep, dominates damsite. Abutment excavation is across valley.



CROSS SECTION shows zoned embankment that is 231 ft high, contains 15 million cu yd.

Grouters

Full-scale earthmoving gets under way this summer on Denver's big Dillon Dam, 9,000 ft up in the Rocky Mountains. A lot of tough construction work is now setting the stage for building the 15-million-cu-yd embankment.

Grouting crews have been busy punching holes 250 ft down from the dam's cutoff trench to seal the valley floor with a grout curtain. Hard rock tunnelers drove a 17-ft-dia tunnel through which the Blue River will soon be diverted. While bad geology below the damsite requires the grout curtain, the rock of the valley walls, if not good, is certainly tough. It's giving blasters excavating for both abutments a bad time.

Dillon Dam is being built by the Denver Board of Water Commissioners to supply the city with Western Slope water via the 23-mile Harold D. Roberts Tunnel. The Roberts Tunnel runs deep under the Continental Divide. It's

GAGE READS 175 psi as grout is pumped into poor rock under site. Some grout holes go down 250 ft.

CONCRETE GROUT CAP (center) parallels dam axis. Pipe nipples in cap guide drillers, hold grout pipes.

Go Deep at Denver's Dillon Dam

also under construction (ENR Oct 29, 1959, p. 32).

The 231-ft-high fill is due west of Denver on the Blue River just downstream from the Blue's confluence with the Snake River and Tenmile Creek. Crest length of the dam will be 5,000 ft; reservoir capacity, 255,000 acre-ft.

• **Dam design**—Design of the rolled fill embankment calls for three kinds of material in four areas (see cross-section).

►Zone I is impervious material in the central area of the dam, including the 80-ft-deep cutoff trench. It will be compacted in 6-in. layers to a dry density of at least 98% of laboratory maximum dry density by the Proctor test method.

►Zone II is pervious material on the upstream and downstream sides of Zone I and extending along the valley floor to the heel of the dam. It will be compacted in 18-in. layers to a relative density of at least 70% by the U. S. Bureau of Reclamation test method.

►Zone III includes pervious and semi-pervious material completing the downstream portion of the dam. It will be compacted in 12-in. layers to at least 95% maximum dry density (Proctor).

The upstream face of the dam will be protected by a 3-ft-thick layer or riprap. Upstream slope will be 1 on 2½; the downstream slope, 1 on 2.

River diversion will be through a 1,712-ft-long, concrete-lined tunnel. This will allow excavation of the cutoff trench and the big pressure-grouting operation to proceed all the way across the valley.

The tunnel has a finished diameter of 15 ft and will serve as the outlet tunnel for the completed project. Eventually, it will be plugged at its upper end to permit construction of a gate chamber and access shaft near its midpoint.

A 53-ft-dia, glory-hole-type spillway in the left abutment will discharge into the outlet tunnel below the gate chamber via a 15-ft-dia vertical shaft. The crest of this concrete-shaft spillway intake will be 14 ft below the top of the dam.

The geology of the area includes sedimentary rock—sandstone, shale, siltstone and mudstone—that contains large faults. The rock strata dip generally down-river. Because of these conditions, large-scale pressure grouting was required.

To determine the amount of pressure grouting needed, test holes were core-drilled 500 ft deep. Leather seals, or packers, were set every 10 ft and the loss of water measured under a pressure of 100 psi to test the permeability of the rock.

The tests showed the need for pressure grouting to depths of 250 ft below the bottom of the cutoff trench (grout holes to be spaced 10 ft apart in a

single line parallel to the axis of the dam).

• **Grouting procedure**—Grouting is performed in 80-ft drill patterns. End holes are drilled and grouted to 250 ft. The central hole on the 40-ft spacing is then drilled and grouted to a depth of 150 ft. Next, the two 20-ft-spaced holes are drilled and grouted 150 ft deep.

The 80-ft pattern is then closed out by drilling and grouting the remaining four 10-ft-spaced holes. The depth of these last four holes depends on the amount of "grout take" in the other five holes, but usually they're put down 60 ft or more. Occasionally, an intermediate hole on a 5-ft spacing is drilled and grouted when warranted by the "take" in the four final holes.

At least 500 grout holes will be drilled. Some of those already filled have taken up to 3,000 bags of cement.

Besides the grout curtain beneath the cutoff trench, considerable grouting will be needed at the abutments. The geology on both sides of the valley is a brittle sandstone mixed with interlayered shale, which is highly fractured.

Grout crews drill the holes through a 3 x 3-ft concrete cap cast in the bottom of the cutoff trench. Both drilling and grouting is done through guide pipes, 3½ ft long and 2 in. in diameter, set vertically in the concrete cap. To drill the 1¾-in grout holes, drills are clamped to the pipe, which acts as a sleeve to maintain vertical alignment. The rotary drills are water-fed, air-operated.

Grouting is done in stages. As the grout holes are drilled into the underlying strata, a cup-type leather packer seal is installed every 25 ft. Grouting pressure begins at 25 psi at the cap, and increases 1.5 psi per foot of depth to the packer. For example, when the packer is 100 ft below the top of the guide pipe, pressure is 175 psi.

The contractor has his grouting equipment set up along the downstream top bank of the cutoff trench. Compressed air for operating grout pumps, drilling holes and operating some water pumps is furnished by 600-cfm compressors.

The grouting layout also includes a maintenance and repair shop, and a water tank for drilling, grouting and pressure testing.

Grout mix varies in cement-to-water ratio from one-to-eight to one-to-one by volume. It is mixed in the top tanks of two grouting plants, and flows by gravity to reservoirs equipped with agitators. Two pumps in each plant suck up the grout from the reservoir. Each pump can develop a pressure of 400 psi. Circulating grout lines leading from the pumps down to the bottom of the cutoff trench supply grout for each hole.

The compressors at the grout-mixing plant do not have a common reservoir. Instead, they feed into several hundred

SERVICE LINES bring air, water and grout to crews in cutoff trench. Grout plants are stationed at top of bank.

feet of 6-in.-dia air line leading down to the trench. The large hose lines serve as a reservoir.

• **Dewatering the cutoff trench**—Dewatering the 80-ft-deep trench was a tough assignment in itself. The water table at the site is about 10 ft below the valley floor, leaving a 70-ft head above the bottom of the cutoff trench.

To handle the high flow expected under this pressure, the contractor uses nine electric-driven and three diesel-driven, 10-in.-dia pumps. They operate from sumps established along the trench and discharge into twin 26-in. pipes, originally used as ventilating pipe in the Roberts Tunnel. The discharge from these two pipes flows into a dammed area beside the Blue River. This pond serves as a settling basin to settle out clay and silt that might affect fish below the site.

Maximum pumpage from the entire dewatering system has ranged from 15,000 to 20,000 gpm, using eleven of the big 10-in. pumps.

• **Excavation**—Rock excavation at the left abutment and for the spillway shaft over the diversion tunnel is giving the contractor his share of headaches. The 200-ft-high cut for the abutment contains 250,000 cu yd of Morrison Formation, which contains considerable sandstone and a sizable amount of quartzite.

Drilling is so tough that carbide bits must be sharpened every 60 ft of drilling. Average life of a bit is 2,000 ft of drilling.

Drill crews use track-mounted drills, with air supplied by two 900-cfm com-

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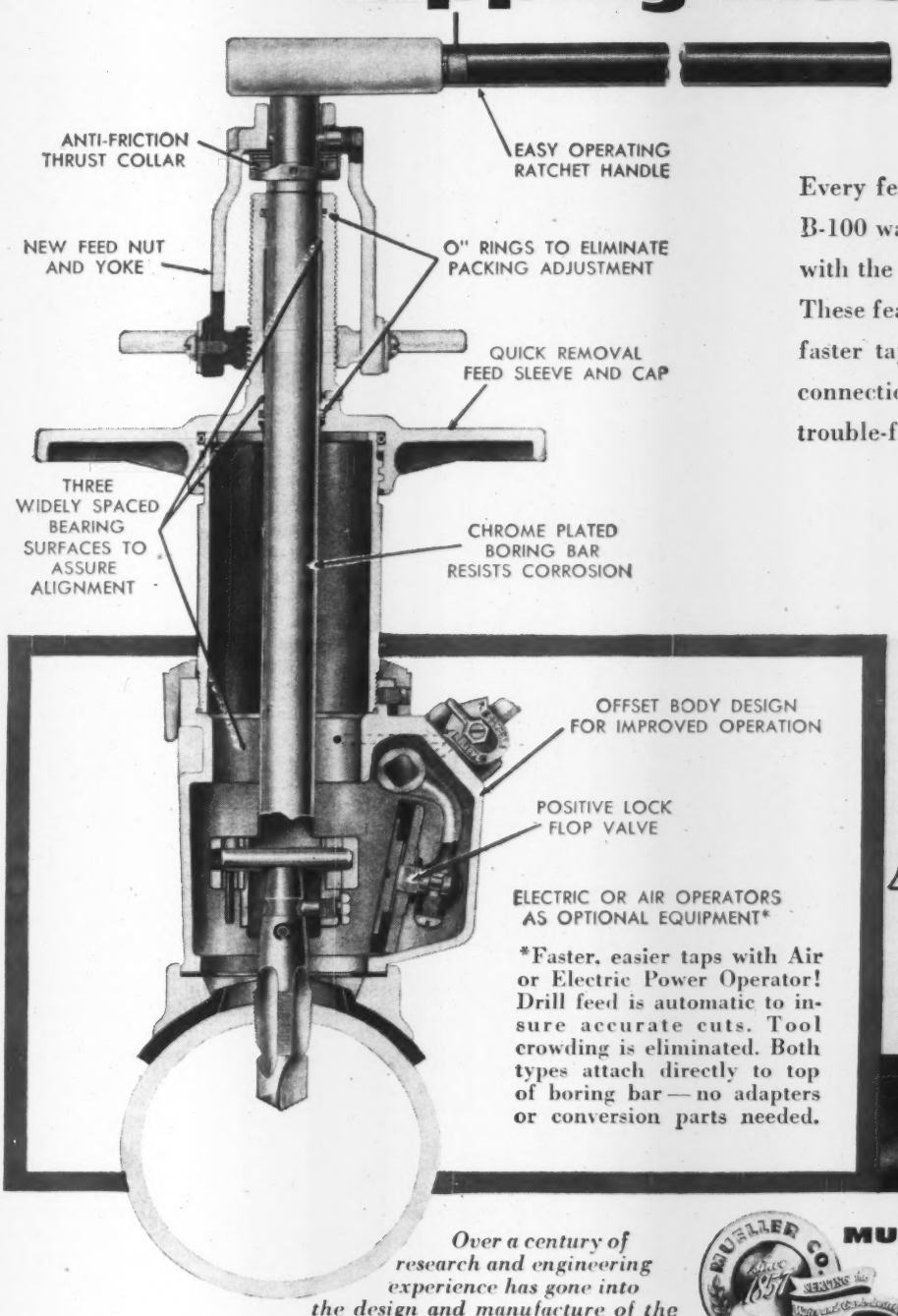
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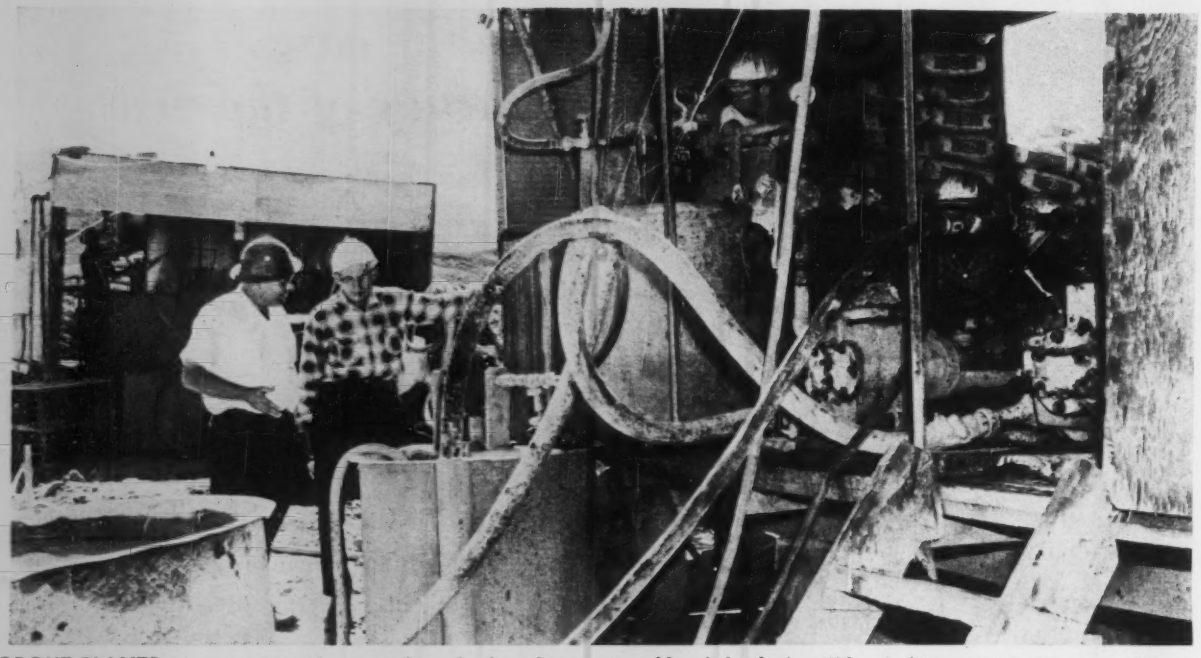


GROUT PLANTS mix grout in tanks on trailers. It then flows by gravity to agitator-equipped reservoirs on the ground. Pumps, capable of developing 400 psi, force grout to crews working in the cutoff trench.

pressors. Holes are drilled 16 ft deep in a 7 x 8-ft drill pattern. A 2½-lb charge of 45% gelatin is used as a primer in the bottom of each of the 4-in.-dia holes. Holes are then filled with about 25 lb of ammonium nitrate, premixed with carbon black.

From 50 to 150 holes are drilled, loaded and shot at one time, yielding about 1 cu yd of rock per pound of powder. Charges are detonated with primacord with 6 millisecond delays, 0 to No. 5.

• **High-altitude earthmoving**—Heavy earthmoving will get under way this summer and reach a peak next year. Fast and efficient earthmoving is a must since the first 6 million cu yd of embankment will involve a one-way haul of about two miles.

The biggest problem is how to get enough power to operate the heavy machinery at peak efficiency 9,000 ft above sea level.

Most of the equipment on the job is new. Engines are turbocharged for operation at the high altitude.

Construction of the 15-million-cu yd embankment will be a shovel and bottom-dump-truck operation built around a fleet of twenty 40-cu-yd bottom dumps, loaded by two 8-cu-yd shovels and an 8-cu-yd dragline.

• **Tough tunneling**—Mining the 1,712-ft diversion tunnel was a tough job for both men and drill steel, according to R. G. Lora, Superintendent for F. H. Linneman, Inc., tunnel subcontractors.

The 15-ft ID bore had a payline diameter of 17 ft 4 in., which includes 8 in. for the rib steel plus another 6 in. on each side. The 8-in steel ribs are spaced on an average of 4 ft c-c.

Drilling the tunnel took five months, working around the clock. It took a nine-man crew about 1½ hr to drill, load and shoot, 1½ hr to muck out, and 20 min to set steel. Miners made 152 ft in the best six-day week.

—Alternate Bidding:— Denver-Style

The Board of Water Commissioners, City and County of Denver, asked for alternate bids on Dillon Dam (ENR Dec. 17, 1959, p. 107). Not only were contractors asked to bid on three different dam designs, but the board reserved the right to switch alternates within a given time limit.

One alternate was for a 95-ft-high dam. The second alternate was a 231-ft-high dam with a crest width of 32 ft to accommodate a roadway. The third also was for a dam 231 ft high but crest width was more than doubled to carry a four-lane divided highway.

Potashnick Construction Co., Inc., was low on all three alternates. But the water commissioners did exercise their right to change their mind. After deciding on the small dam, the board later had a change of heart and switched to the second alternate—the big dam with the narrow crest. Potashnick ended up with $10.9 million worth of business instead of $5.6 million. Denver will have 255,000 acre-ft of water instead of 19,000 acre-ft.

About 50 holes were drilled per round to 5-ft depth. Eleven millisecond delays were used in the entire drill pattern. About 125 lb of 45%-strength powder was used per round.

Holes were driven from a two-deck jumbo, using seven jackleg drills with both throw-away and carbon-chisel bits.

As mining of the diversion tunnel proceeded, 1¾-in.-dia feeler holes were drilled horizontally 25 to 50 ft into the heading. This was done as a precaution against sudden water pressures.

Scrubber-equipped diesel trucks handled the muck. Forced air ventilation was provided by a 36,000-cfm fan and a 26-in.-dia pipe.

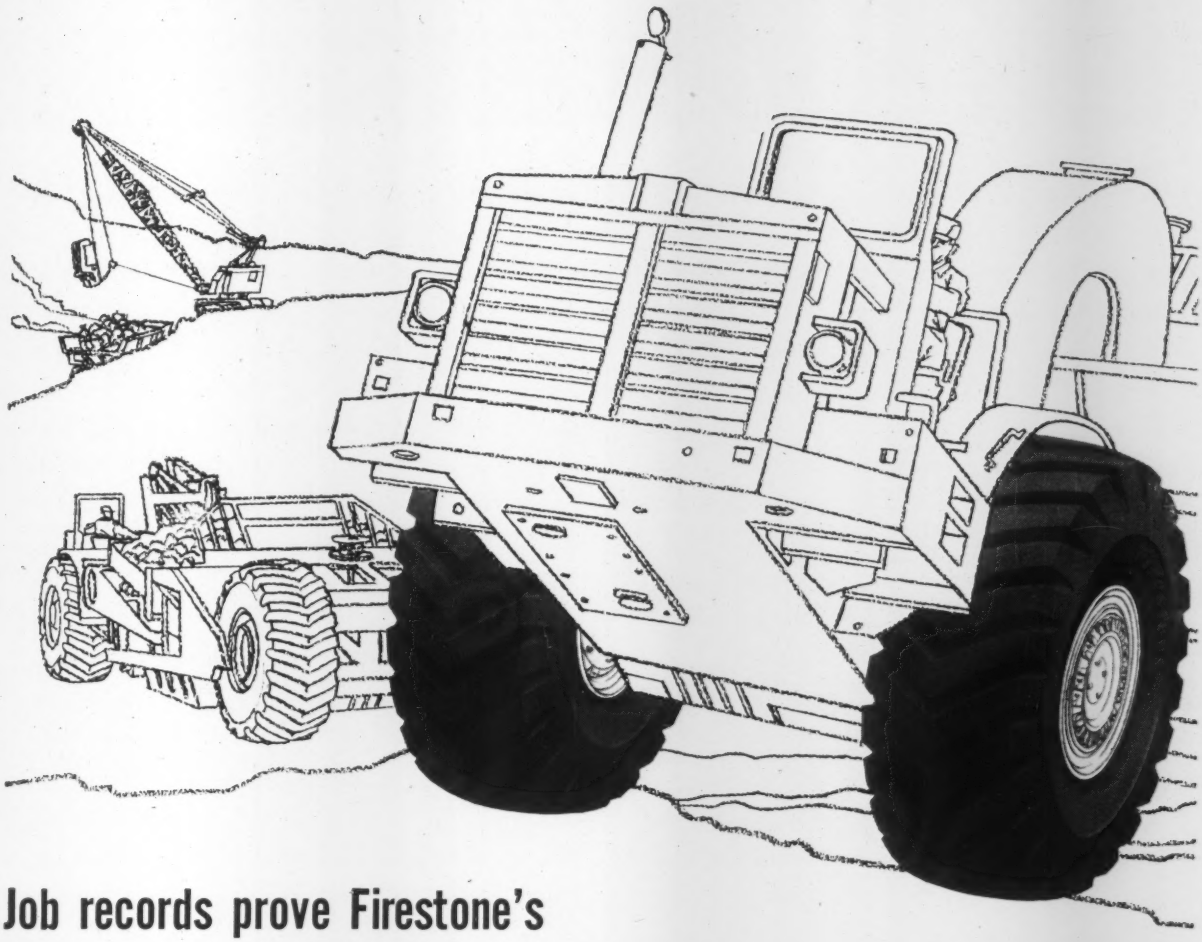
Concrete lining of the tunnel continued all winter. It is batched at a nearby plant, delivered in four 6-cu-yd truck mixers and pumped into the forms.

All concrete work in the outlet system, totaling 20,000 cu yd, is being performed by a subcontractor, A. S. Horner Construction Co., Denver.

Potashnick Construction Co., Inc., Cape Girardeau, Mo., holds the $10.8-million general contract for Dillon. Tipton and Kalmbach, Inc., Denver, are consultants. H. J. Dickenson was their project engineer, M. G. Church their field engineer.

Field engineers for the Denver Board of Water Commissioners include: Mark E. Barber, construction; E. F. Pederson, resident; and Charles G. Anderson office engineer. H. E. McBride is project manager for Potashnick.

Completion of the Dillon project is set for November 1963.



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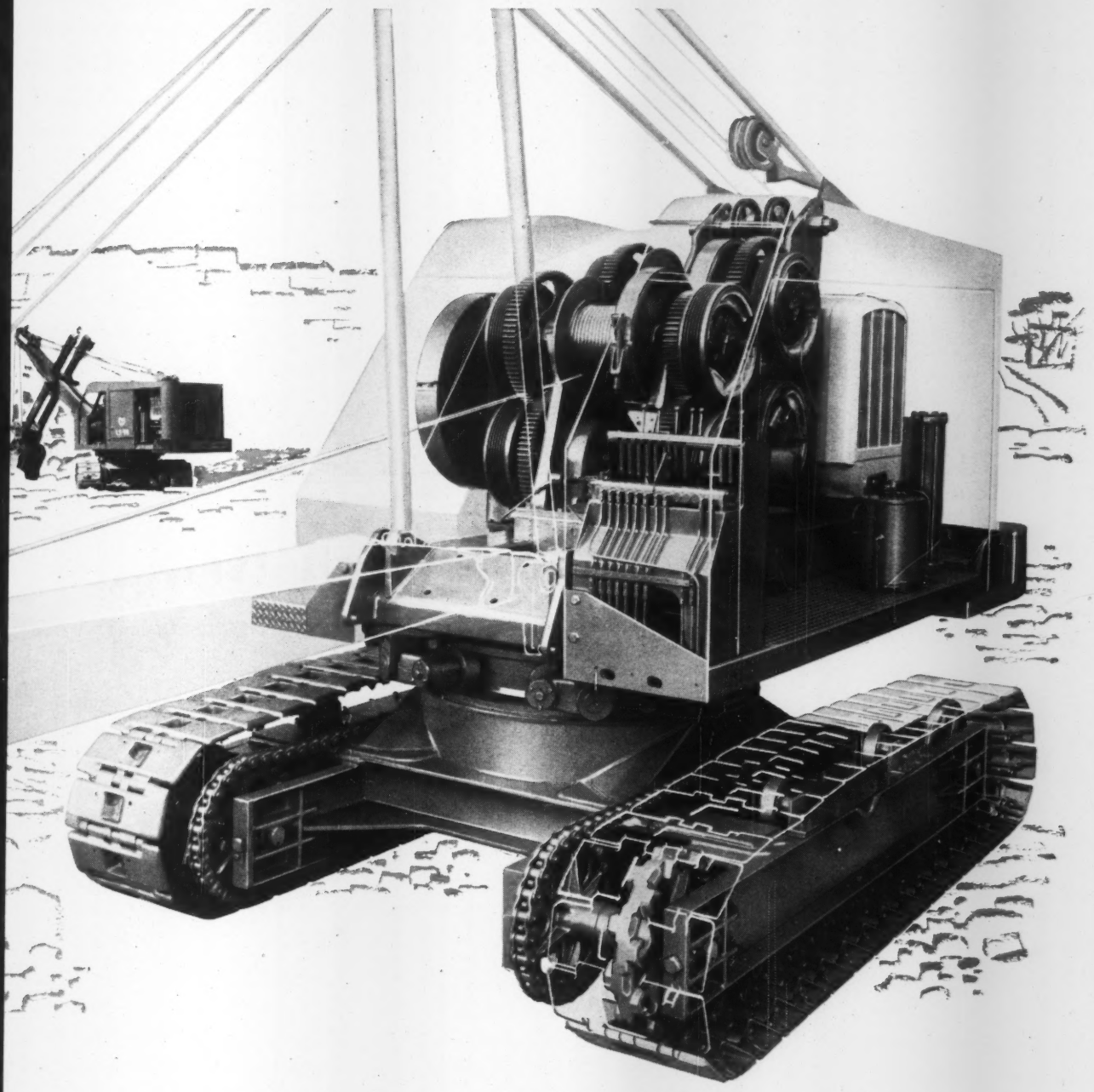

NOTE: The entire upper machinery of the Full-Function Design models (8- to 40 ton capacity) can be field-stripped, piece by piece, without removing major portions of the cab. For fully-illustrated, descriptive literature on the various models in the Link-Belt Speeder line, see your distributor. Or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

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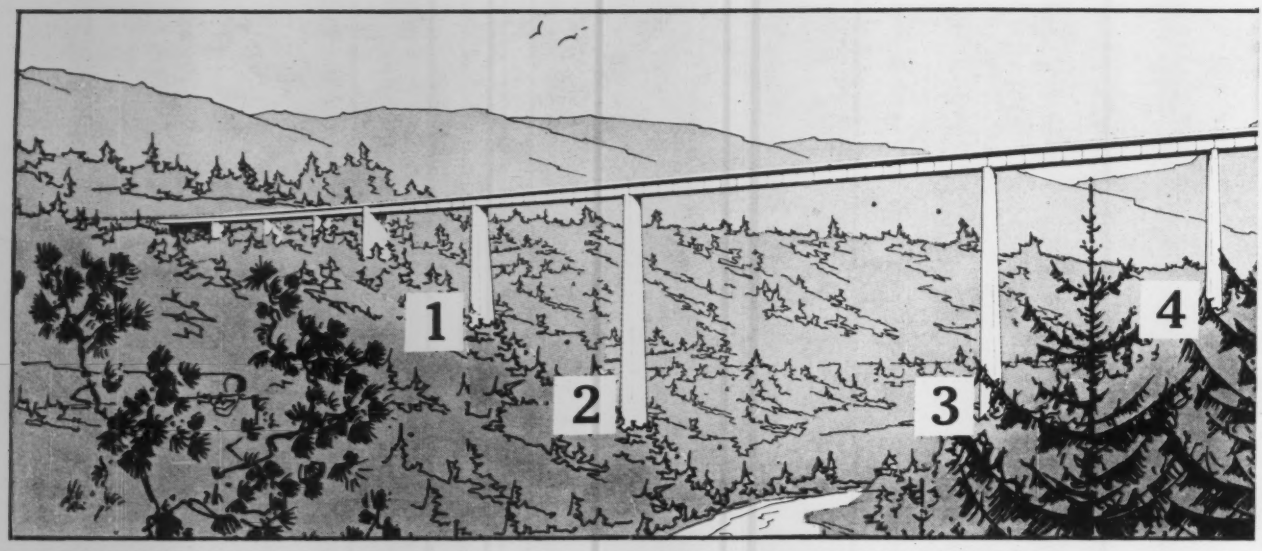
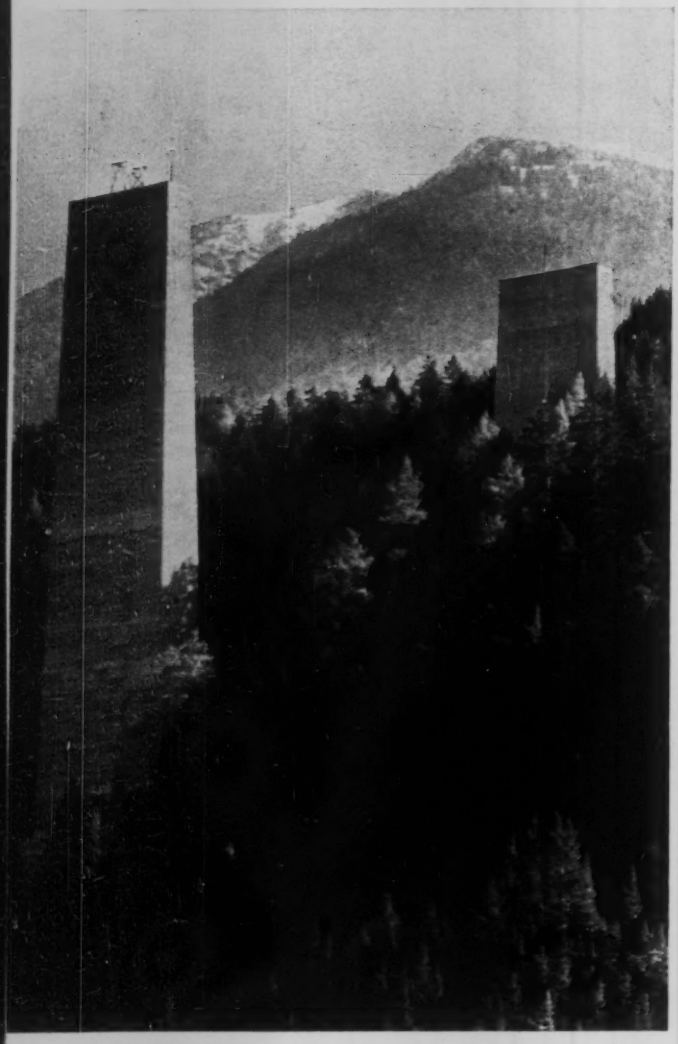
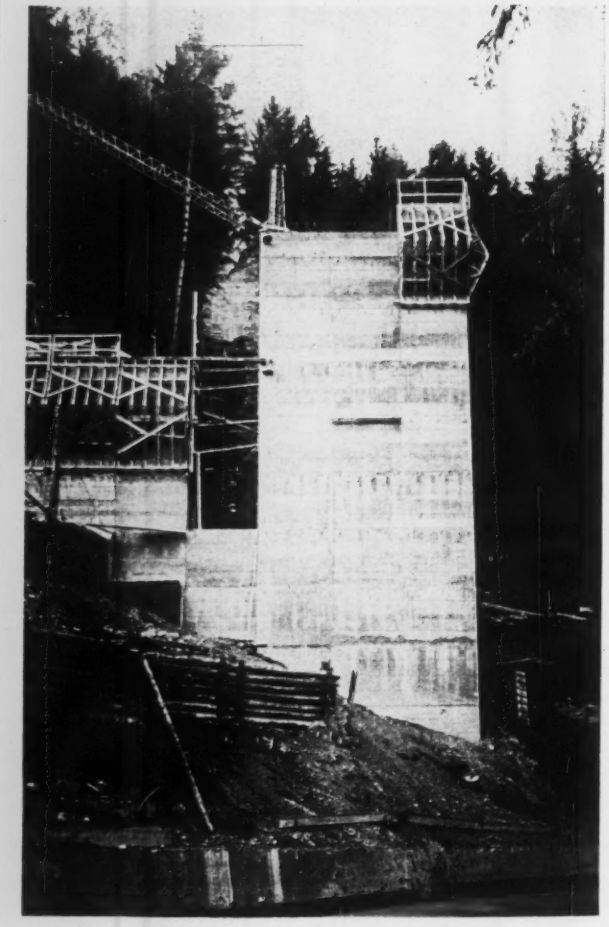


EUROPE'S HIGHEST BRIDGE—The "Europabruecke"—will soar more than 600 ft above Austria's Sill River valley.

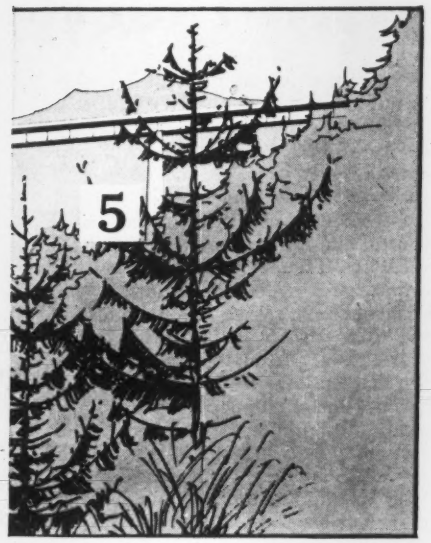
High Bridge

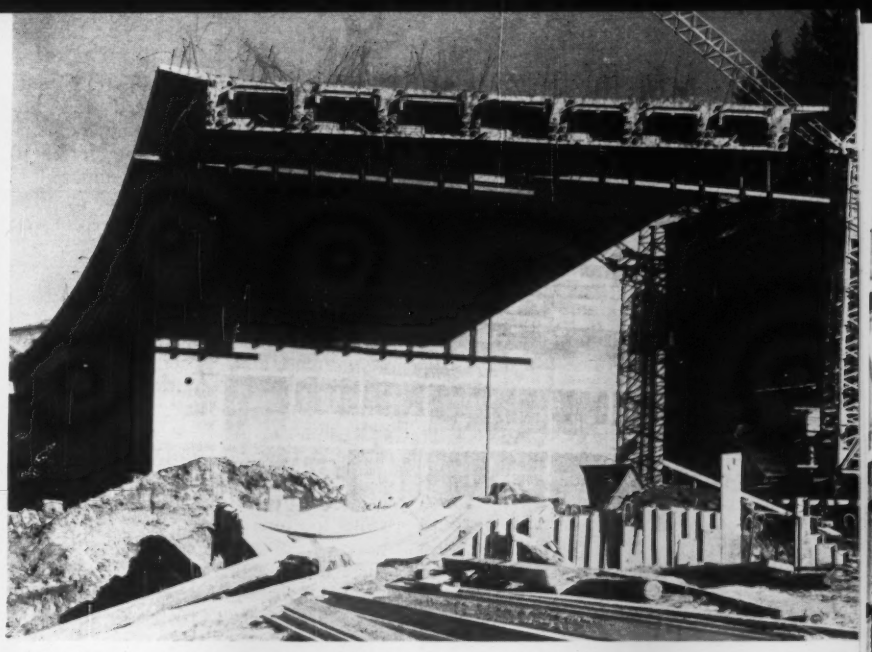


TAPERED PIERS rise from steep side of valley.



SLIDING FORMS shape tall, slender piers.





PRESTRESSED CONCRETE spans flank one side of main crossing.

Rests on Designers' Headaches

Foundation troubles and financing problems are delaying completion of Europe's highest bridge, which will tower 623 ft over Austria's Sill River valley. The 2,296-ft structure is part of a new autobahn connecting Innsbruck (Tyrol) to the Italian road system south of the Brenner Pass.

Absolute deadline for its completion is February, 1964, when Austria will play host to the winter olympic games.

The bridge is a six-span steel box girder with orthotropic plate deck. Its roadway is asymmetric in cross section, with three lanes in one direction and two in the other. The extra lane is for heavily loaded trucks moving up a 4% grade. Riding surface will be about 2 in. of asphaltic mixture, placed in three courses.

Three approach spans on one side of the main crossing are prestressed concrete.

Slender, hollow reinforced concrete piers of great height support the structure. One of the piers supporting the 649-ft central span is 492 ft high; the other, 459 ft.

Difficult foundation conditions forced designers to develop an individual solution for each of the five piers of the main crossing. For one of these foundations, extensive in-place rock tests were used to prove the design (see p. 76).

An official design was developed by bridge engineers of the Tyrol provincial government, lead by Josef Gruber. Contractors were allowed to bid either on the official design or to develop—within 3½ months and with no compensation—alternative designs.

Principal design criteria included:

- Total roadway width of about 73 ft, with five 11-ft traffic lanes, a narrow center divider and a sidewalk on either side.
- Lanes sloping toward the center to force out-of-control vehicles in that direction rather than against the exterior guard rail. This design also gives drivers more confidence.
- Live load of one 66-ton truck or a pair of 28-ton tractor-trailer combinations, one in each direction.
- Wind loads of about 2,200 lb per sq ft with no vehicle on the bridge and half that amount with the design vehicle present.
- Earthquake loads corresponding to class VIII, International Earthquake Rating System. Horizontal acceleration of 1/40 g was used for rock-based piers, 1/20 g for gravel-based piers.

The bridge is being built by a group of associated Austrian construction firms, the "Cooperation Group, Europe Bridge."

• **Main crossing**—The steel hollow-box girder has an over-all width of 32.8 ft and depth of 25.2 ft at midspan. At one abutment, depth is 18.7 ft, at the other, 15.4 ft. The roadway cantilevers about 20 ft on each side of the girder.

The stiffened orthotropic plate that forms the upper flange of the box girder and the bridge deck is sheet steel from about ⅜ in. to about ⅝ in. thick. Longitudinal stiffeners for the plate are spaced about 1 ft 4 in. c-c. Transverse floor beams are spaced about 5 ft c-c. Vertical pipe drains pass through the

ELLIPSES support pier I.

girder at intervals of about 50 ft along the bridge centerline.

Most of the structure is welded. High-strength bolts are used to connect the longitudinal stiffeners and floor beams of the deck, as well as similar items of the girder webs and lower flange.

The contractor will prefabricate 29-ft, 6-in. long sections of the deck, lower girder flange and girder webs. Workmen will assemble the sections, field weld the joints and make the bolted connections.

The contractor will use falsework for the girder sections only near the abutments. Each abutment will be secured by tie-down cables to resist tipping when each 266-ft end span is closed. Each of the other spans will be built by cantilevering from the adjacent piers with closure in mid-span.

• **Prestressed approach spans**—Four approach spans at one end of the bridge are prestressed concrete multi-web box girders. The units are stressed both ways by the VSL method.

Total length of this section is about 394 ft with two 108-ft spans and two 89-ft spans. The approaches are on a curve with 1,300-ft radius and have a cross slope of 6%.

Over-all width of the girder is about 60 ft, not including 4.5-ft cantilever sections on both sides. Girder depth is about 5.5 ft; top flange is about 9 in. thick, and the bottom flange, about 4.5 in. Exterior webs are about 2 ft 5 in. thick, interior webs about 1 ft 8 in.

Six longitudinal prestressing cables are used in the bottom of each web. Each cable is about 0.3 in. in dia and each is stressed to about 110 tons in a three-stage process. First stressing—to about 30% of final load—is done from two to three days after placing the concrete. After about two weeks, the contractor increases the stress to about 75% of the final value. Final load increment is added after 28 days.

• **Pier construction**—The five slender and tapered piers of the main crossing have different heights, varying from about 480 ft to 120 ft above the foundations. The piers are three-chamber hollow reinforced concrete structures. Wall thickness at the top varies from about 11¾ in. to 13¾ in. Wall thickness increases at a uniform rate of 0.0166 in. per ft, attaining a maximum value of nearly 20 in. at the bottom of the highest pier. Top of each pier is about 52 ft long (perpendicular to the centerline of the bridge) and from slightly less than 10 ft to more than 15 ft 6 in. wide. Largest pier is nearly 40 ft wide and 75 ft long at the bottom. Sides of each pier taper uniformly from top to bottom. Interior diaphragms are provided in each pier at intervals of 49 ft to 59 ft.

The contractors adopted and improved the West German "Siemens-Bauuman" system of sliding forms to cast the piers. Forms are about 4 ft high and advance at a rate of about 8 in. per hour; concrete is thus in the forms about six hours.

• **Foundations**—Pier foundations have been a nightmare. First, varying conditions forced an individual design for each foundation. Later, on-site excavation disclosed conditions that were worse than anticipated; this forced the extensive rock tests at one foundation site and re-design (not yet completed) of another foundation.

Pier 1 rests on twin elliptical concrete footings cast in rock pits. Engineers chose an elliptical shape to conform to the pier design and because of the need for high shearing resistance in the rock deposit. Interior horizontal cross beams brace each ellipse.

Engineers installed a pendulum in the first of the two ellipses in order to measure vibrations caused by removal of rock for the second ellipse.

Total depth of the foundation below the ground surface is about 140 ft. The foundation is topped by a reinforced concrete cap.

Pier 2—the tallest—sits on a three-compartment, hollow-box foundation that in turn rests on a layer of compact gravel overlying rock. The foundation is about 67 ft x 98 ft in plan and 112 ft deep.

Designers anticipated no problems with the foundation of pier 3, which was to rest on rock. Excavation revealed unexpectedly bad conditions and the foundation is being redesigned.

The foundation of pier 4 comprises a reinforced concrete box supported by eight concrete caissons. The four caissons on the up-slope side are vertical; the four on the valley side are battered to provide stability against sliding down the slope. Total depth of the foundation is about 125 ft.

Pier 5 is founded on compact gravel. The foundation comprises six hollow box sections placed side-by-side, and pyramided on top of one another, in the manner of a child's building blocks. The foundation is about 33 ft by 85 ft in plan, and 39 ft deep.

• **Timetable**—Completion of the structure has been delayed by lack of funds, but builders still plan to finish it before February, 1964. First girder sections on the Europe Bridge will be placed next spring. Several other bridges and the highway will be completed to meet the same deadline.

Cost of the spectacular structure will be about $3.4 million. Of this, about $1.9 million will be for concrete construction, including the foundations.

In-Place

Austrian engineers performed a series of unusual in-place shear tests on rock to prove the load-carrying ability of a questionable formation that will support one pier of the "Europabruecke," Europe's highest bridge.

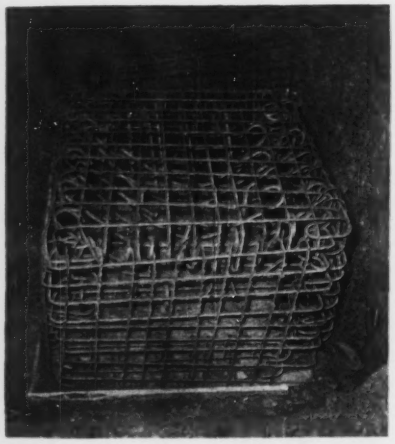
Each test involved the application of vertical and horizontal loads to a 3.28x 3.28x1.64-ft cube hewn from a badly disintegrated deposit of mica slate with pronounced cleavage. Foundation of the cube was not disturbed.

Designers placed the foundation for the first pier on the Innsbruck side on a mica slate formation that slopes steeply toward the valley floor in a direction roughly parallel to the surface slope. Preliminary excavation disclosed that the formation was much worse than had been anticipated from an exploratory program of core drilling.

Ludwig Faber, Austria's top administrative authority on bridge construction and a civil engineer, suggested what is believed to be Europe's third application of large-scale shear testing to rock formations.

Working their way into grown rock near the planned foundation, miners carefully removed the rock at three sites to form caves in which the shear tests were conducted. The miners left standing an in-place cube of rock in each cave. Sufficient space was cleared around the sides and top of the cube for the installation of hydraulic jacks to apply loads.

Workmen then built a reinforced concrete cap over the rock cube. Walls of the cap were about 4 in. thick, and the top plate was nearly 20 in. thick. Boards placed at the bottom of the wall forms prevented bonding of the concrete to the floor of the cave.



CUBE OF ROCK was left in place when miners dug cave, then capped with reinforced concrete.

Rock Tests Prove Pier Foundation

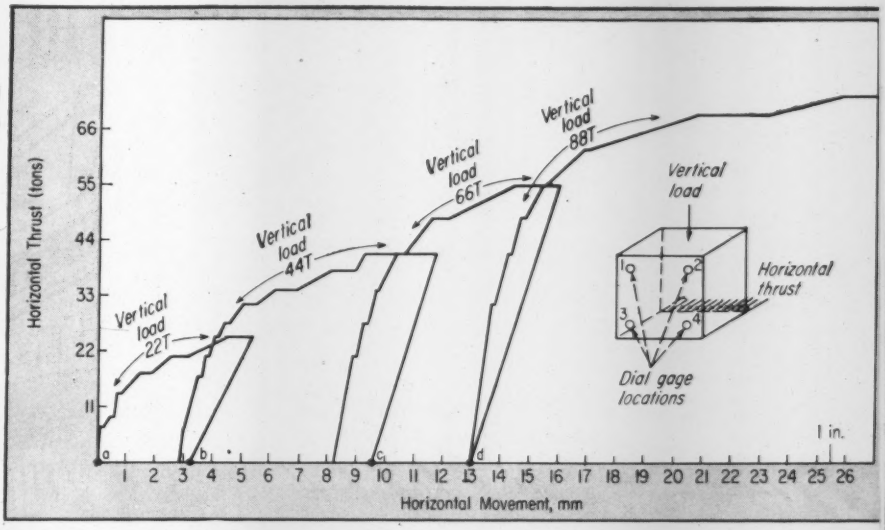
Engineers directed installation of four hydraulic jacks with a total capacity of about 154 tons. Braced against a cast concrete wall inside the cave, these jacks later exerted a horizontal thrust from the mountain side outward into the valley. The four jacks were synchronized through a system of high-pressure piping to exert equal loads. The jacks were placed at equal spacings in a straight line to act on the cube just above its base. Timbers and steel beams were used to transmit load from the jack rams and to prevent cracking of the concrete. Four dial gages—one at each corner—were installed so as to read horizontal movement of the cube on the face opposite the horizontal jacks.

To apply vertical load, workmen placed a 385-ton-capacity hydraulic jack at the center of the top surface of the concrete cap. The jack reacted against the roof of the cave through a bearing block with roughly spherical surfaces, a system of timbers and beams, and a concrete plate.

Basic test scheme was to put on different vertical loads (about 22, 44, 66 and 88 tons), apply the horizontal load in planned increments, and record horizontal movement of the cube measured by the dial gages.

Engineers began each test by applying 22 tons vertical load to the cube. Horizontal thrust was applied and dial readings noted. After horizontal movement was recorded, horizontal pressure was relieved; the vertical load then was increased and the process repeated until total load reached 88 tons.

The results of one test appear on the accompanying graph. All four dial gages showed that the same magnitude of horizontal movement occurred during the test.



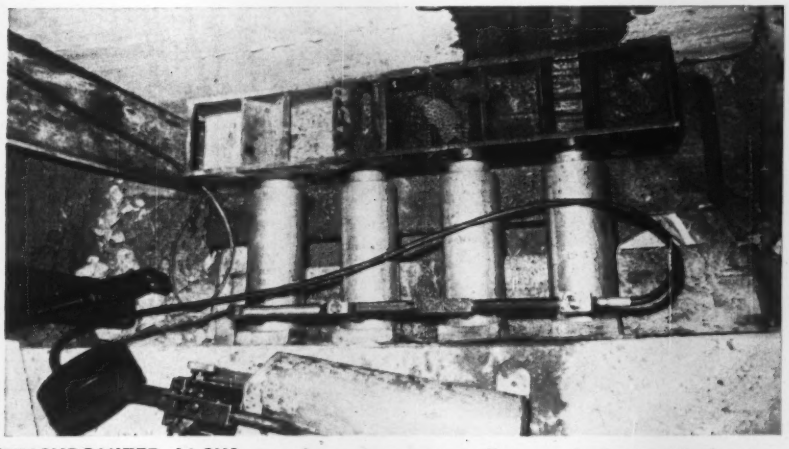
ROCK FORMATION'S load-carrying ability was proved by these test results.

Basic objective of the tests was to determine friction and cohesion values in the rock mass. Analysis of the results showed the major portion of shear resistance came from friction, with only a small amount of cohesion. The test was planned so that high shearing stress occurred on a plane roughly parallel to the planes of cleavage in the mica slate formation.

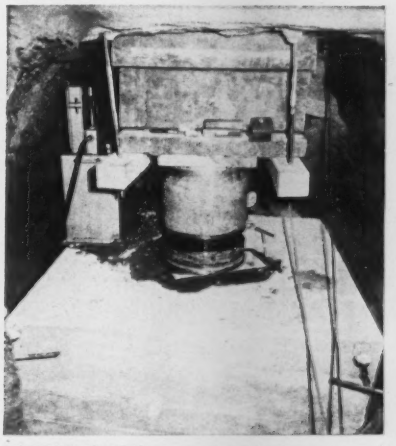
Highest test loads were planned to provide information about behavior of the rock at a factor of safety of at least 1.5 times the design loads. Application of 88 tons vertical pressure exceeded the stipulated factor of safety.

Mr. Faber said the results of tests were entirely satisfactory and might establish a pattern of such tests to be used in the future on similar projects. He believes field tests of this type to be simple, fast and economical.

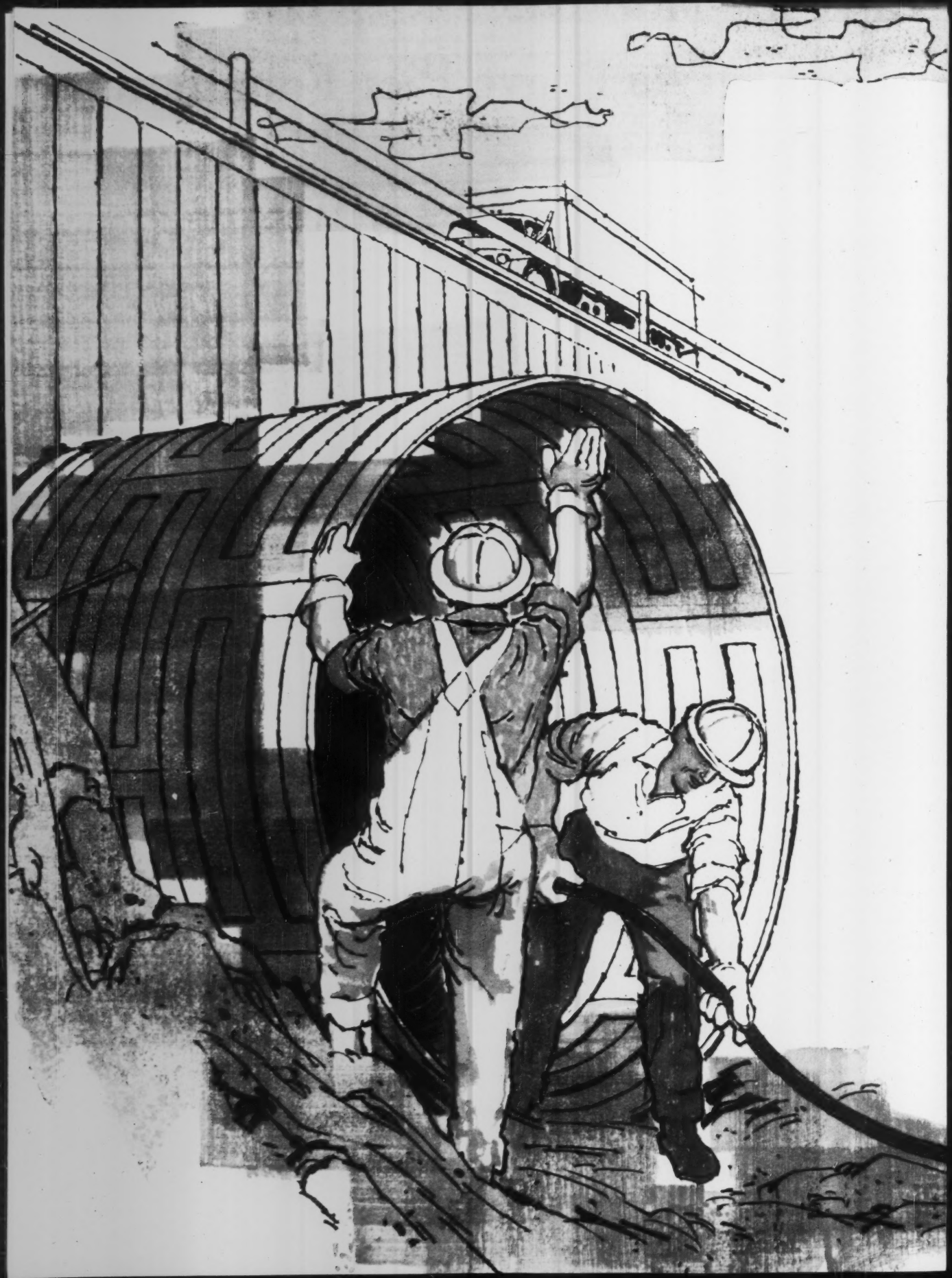
Personnel of Universale, Hoch-und-Tief-bau A. G. of Vienna did the preparatory work and conducted the tests, in cooperation with other firms of the joint venture. Supervision of the tests was by Josef Gruber of the Tyrolean provincial government. The over-all project is part of the Austrian government's road building program, planned by the federal Ministry for Trade and Reconstruction. Professor Otto K. Froehlich of Vienna Polytechnicum participated in analysis of the test results.



SYNCHRONIZED JACKS reacted on a concrete wall to apply horizontal thrust to in-place rock cube. The jacks are spaced equally across the bottom of the cube and connected by high-pressure piping.



SINGLE JACK reacted against cave roof to apply vertical load. Note dial gages to measure horizontal movement.



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You name the shipping date—and standard Truscon Tunnel Liner Plates will be on your job when you're ready for them. No time lost—no money lost.

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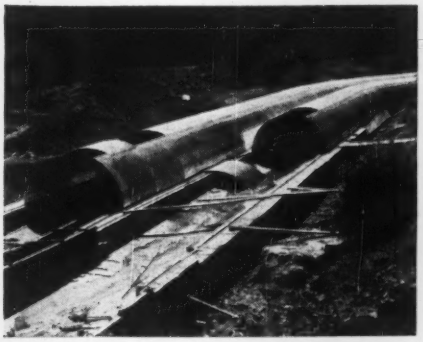
Extra thick and strong, Truscon Tunnel Liner Plates are constructed with four-flange plus four solid right-angle corners, providing a safe working area under almost any circumstances. All erection work is done from inside the lining, due to unique four-corner flange design.

Truscon Tunnel Liner Plates are easily handled and readily bolted into place without special tools or special training. Rapid assembly saves man-hours and dollars.

Truscon Plates, made by the Truscon Division of Republic Steel, are available in black steel, or with a tight coat of hot-dipped galvanizing. They are also furnished asphalt-coated, or galvanized and asphalt-coated. For complete information, call your Truscon representative or write direct.



REPUBLIC SECTIONAL PLATE ARCHES in this design have been used in 12 major Cleveland projects since 1934. Cleveland engineers agree that it is an efficient, low-cost method of solving many problems of design and performance. Assembly is fast and easy, with a minimum of labor and equipment. Proven reliability is built into the resilient, galvanized, heavy gage steel arch. Send coupon or ask your Republic representative for complete information.

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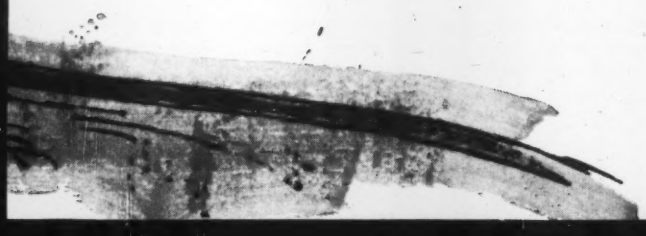

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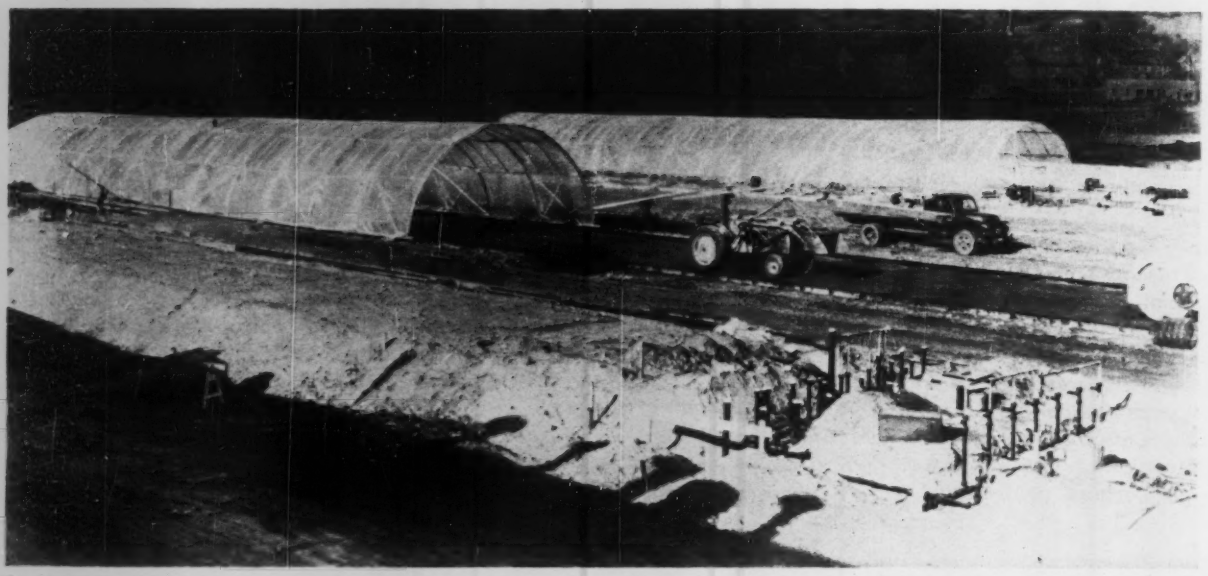
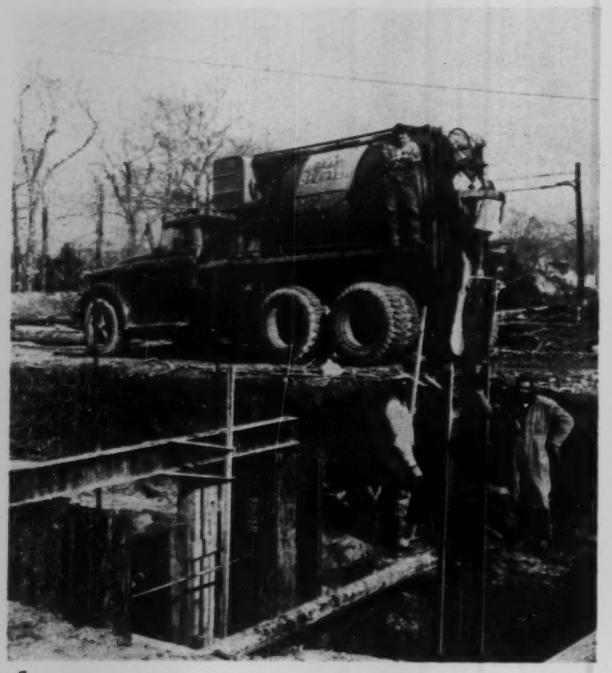
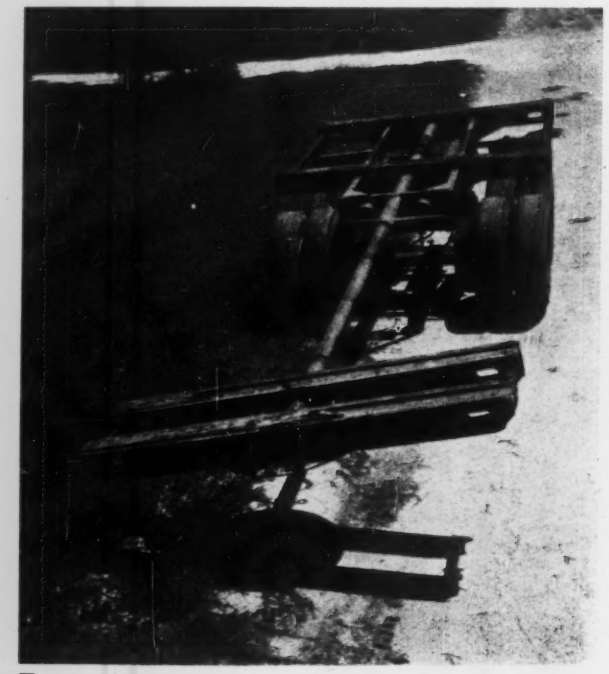
Seven Ideas You Can Use on the



1. PROTECTION FOR CONCRETE—Two commercially available aluminum and plastic structures, designed by their manufacturer as swimming pool enclosures, were adapted by a Connecticut contractor to protect concrete slabs cast in sub-freezing temperatures. The units manufactured by Lord and Burnham of Irvington, N. Y. are 32 ft wide, 156 ft long, high enough to permit passage of a ready-mix truck. Enclosed areas were heated with blowers. Units were moved as needed.



4. SPOT DELIVERY—Washed gravel delivered in a ready-mix truck is chuted into an unsheeted sewer trench with virtually no loss of material. Both chutes and truck are moved often to minimize hand leveling.



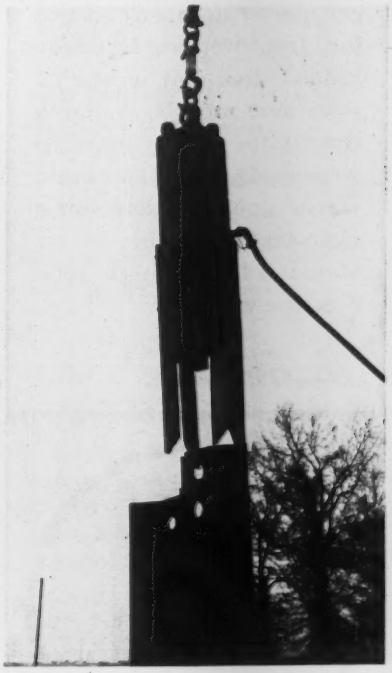
5. FIXED BOLSTER— This pole trailer carries its fifth wheel bolster at the forward end of its tongue. Unit is balanced so tract can back under the bolster or pull out from under it for quick hit or disconnect without jacks or dolly wheels.

Job Site

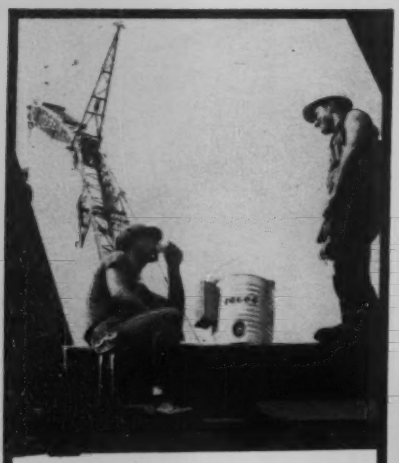
2. FOOT WIPER—If the operator of this crane gets his feet wet he dries the soles of his shoes on the piece of old rug anchored to the foot rest so his feet won't slip off the brake pedals. Result is increased safety and greater efficiency.

3. SAFETY HANDLE—A short piece of ½-in. reinforcing rod, bent into a "U" and welded to the back of a hook permits workmen to keep hands away from the jaw of the hook and out of danger while hooking onto slings, chokers, spreaders or loads.

6. TRIPLE DUTY—The 14-in. WF section on the street served as an aligning guide for steel sheetpiles during their installation, as a top whaler for the installed sheets, and also acts as a temporary curb. The guard rail above the curb is an 8-in. channel welded to soldier beams that are part of the temporary retaining wall.



7. HAMMER GUIDE—Slotted ¾ in. plates bolted to sides of sheeting hammer permit setting the hammer on the sheets without the use of tag lines.



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Rig Climbs, Crawls and Swims

The Go-Devil Do-Liner won't fly, but according to its manufacturer, it will do almost anything else that any vehicle can do—and a few things that others can't. Its wheels, mounted on off-set axles, can be swung in a 360 deg vertical curve to keep the body level in rough terrain.

Flotation tires permit travel over swampy ground and across shallow stream beds, and a propeller in the rear will push it through deep water. Segmentation gives the vehicle an 18 ft turning radius.

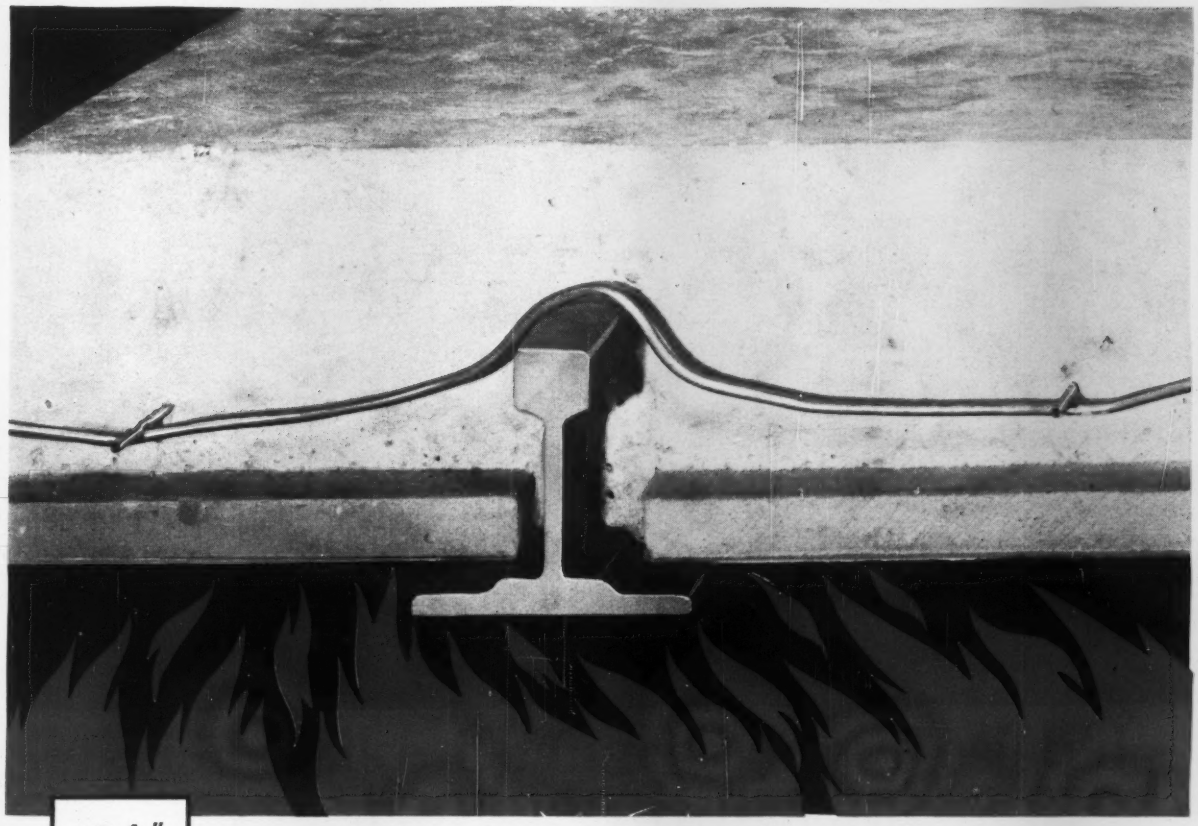
Wagner Tractor, Inc., of Portland, Ore., which built the rig, claims it has great potential in both military and construction fields.

Hitch Your Wagon to a Mat

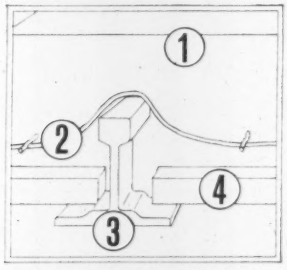
This tire salesman's dream is called a mat puller. It's made up of seven four-wheel wagons linked to form a vehicle 140 ft wide. The Corps of Engineers uses it to winch concrete erosion mattresses off barges and up the banks of the Mississippi River.

The mattresses are a modern version of the willow mats used for river bank erosion control for many years. They are made of precast concrete slabs connected by embedded copper-clad wire. The big mats are delivered on barges (ENR Oct. 16, 1958, p. 54). The mat puller is rolled down into the water and attached to the mat, then it's winched out of the water and up the slope until the mat is properly positioned.

The rubber tires are a refinement over the first mat puller, which rolled on steel drums. The steel rollers tended to break up the in-place mats when it rode back down over them, but the big balloon tires exert low enough pressure to avoid this.



2½" Poured Gypsum Roof Deck passes 2 hr. fire test!



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2. Mesh reinforcement
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In one of the most rugged fire tests ever run, a Gypsum Roof Deck, poured 2½" thick over ½" gypsum formboards, withstood a furnace temperature up to 1850°F. for over 2 hours before the first end-point temperature was reached on the top surface. The deck *still* carried an imposed live load of 40# per square foot when the test was completed.

Compare this to fire ratings of one hour for 2" gypsum roof decks, and less than one hour for most other decks, and you'll see what a bargain this 2½" system is. The extra half inch thickness of gypsum costs only a few cents per square foot, and adds a full hour to the fire rating!

Ask your Gold Bond® Representative for a copy of the test report, or write Dept. EN-51.

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Quaker Engineering, Inc., Pittsburgh, Pennsylvania, use one of their two Lorain-26 hoes to dig 100,000 lineal feet of sanitary sewer trench through earth and rock in Greenhock, Pa.

There's Rock in Greenhock

This heavy-duty ¾-yd. Lorain-26 hoe is doing a great job in Greenhock, Pennsylvania—and Lorain-26 hoes like it are doing a similar great job the world over.

The "26" is a high-production, rugged machine with excellent stability to permit use of a long, heavy hoe boom for forceful "crowding" action for digging the hardest materials. The boom is of all-welded box section, goose-necked for maximum digging ranges and tapered for maximum visibility in the trench. The dipper has a rounded, non-heeling back, plus side cutters, so it fills easily, dumps cleanly.

"Universal-stick"

The "Universal-stick" has an adjustable diaphragm that is easily widened or narrowed on the job to fit any applicable width of dippers.

Other Lorain-26 features

5 interchangeable, easy-acting, long-lived, shoe-type clutches are mounted on a single, separate shaft.

Truss-type turntable bed assembly is stiffer, stronger, maintains proper shaft and gear alignment.

"E-Z" manual controls with linkage on anti-friction bearings.

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Letter from Lagos:

Nigerians Like Changes They Resisted

NEW HOUSING moves people from slums, clearing Nigeria's capital for rebuilding.

By Paul Conklin

Resistance to progress can be greatest where the opportunity for progress knocks loudest.

Case in point is the clearance of slums in Lagos, federal capital of Nigeria, one of Africa's emerging new nations. This project, one of Africa's largest, is about half done, and when the whole $9½ million worth is finished, some of the worst slums on the continent will have been cleared; 30,000 persons will have been provided decent housing.

Yet, Lagos, island city of half a million in the Gulf of Guinea, gave staunch resistance to the cutting away of wretched shanty towns that had spread like a cancer throughout its vitals.

A Lagos Executive Development Board produced a plan for slum clearance in 1951, but such fierce resistance boiled up that no Nigerian politician would be identified with it.

By 1955 their British governors convinced Nigerian leaders that it simply would not do for them to achieve independence with such a disreputable looking capital.

Still, opposition to the Lagos Central Planning Scheme ran high. Occupants

*ENR's correspondent, **Paul Conklin**, makes Lagos his base for travels throughout western Africa.*

of the area to be rebuilt saw it as a government device to deprive them of land that had often been in the same family for generations. In traditional African fashion, Lagos families lived together in "compounds" of many households. People were frightened by the prospect of being uprooted from familiar surroundings and having their families broken up and scattered. Families thus fragmented could not exist because their members could no longer protect and support one another, the argument ran.

Insecurity led to violence. When the development board sent its trucks in to move the first families, riots broke out. Women stormed the board offices and attacked its officials. People locked themselves in their houses and refused to budge. Stubborn tenants were evicted in the middle of the night when they were half-asleep and in some extreme cases houses were knocked down by bulldozers while their occupants were still inside. However, the resistance gave way within two or three months when word came back that Suru-Lere, a new housing development at the outskirts of Lagos, was not overrun by thieves and wild animals.

Suru-Lere's first subdivision was opened in 1955 and contained 900 houses. The second group had 600 units. A third with 400 units will be completed this summer. The construction is all the same. Houses have cinderblock walls, solid concrete floors, and double pitched roofs of corrugated asbestos sheets on timber roof trusses. Except for single-room units, all have a water tap in the kitchen sink, a shower, and a toilet which empties into a septic tank. All are provided with electricity. Each house has room for its own garden plot.

Construction cost for a house with two living rooms, kitchen, small storage room, shower and toilet is $1,540. When these same houses are built in two-story blocks of four units, the unit cost becomes $2,240. A house with three living rooms costs $1,890, or $2,702 in a two-story block. A house with four living rooms costs $2,450. A single-room unit without its own toilet runs $1,064 (these are designed for bachelors).

Density of population at Suru-Lere is 2.6 people per room, or about one-fourth what it is in central Lagos. Suru-Lere rents ($3.50 per room a month) are much lower than slum landlords are able to collect.

The development board has made Suru-Lere as much of a self-contained township as possible, building schools, shopping centers, and clinics and leaving room for churches, banks, movies.

In theory, Suru-Lere was intended to be a temporary residence for the people of central Lagos, who would return to the city as soon as their land could be reconveyed to them. In actuality, Suru-Lere has become a permanent housing area. Once they discovered how much better it is to live in clean, pleasant surroundings, and once they discovered that living apart from one's family has certain advantages, people have been loath to return to the city. Another factor is that virtually nobody has sufficient money to build the multi-story apartment blocks which the planners think are best suited for the center of the nation's capital.

As a consequence, the redeveloped land, on which the city has already spent $1.3 million for road surfacing, drains, sewers, lighting and water mains, is being sold to commercial developers for non-residential purposes.

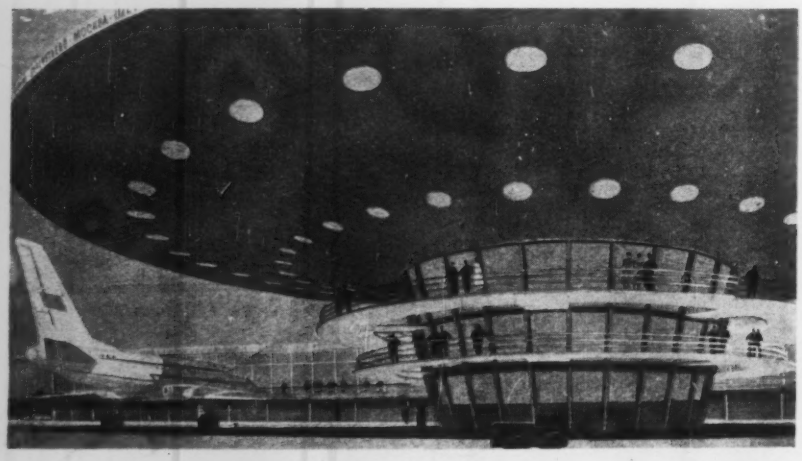
During the scheme's early years the development board could build new houses faster than it could clear away the slums. Now, however, slum clearance on an eventual 72 acres is being held up by a building bottleneck in Suru-Lere. Only African contractors are employed now that Nigeria is independent, and they are handicapped by a lack of financing and machinery with which to work.

In the past there was speculation whether the scheme to clear Lagos of slums would be pushed forward once Nigeria achieved its independence. The answer seems to be yes, but not as vigorously as before. There are other projects—bridges, power stations, harbor installations—competing for Nigeria's limited supplies of capital.

But there is scant chance that the government could abandon the scheme, even if it wanted to. For now, virtually all of the people still living in central Lagos want, in distinct contrast to the resistance of early days, to move to Suru-Lere.

And as the slum clearance moves ahead, a complex of modern government office buildings, a supreme court, parliament buildings and living quarters for members of parliament has been built. In addition, the city's skyline changes almost monthly as new banks, hotels, stores and private office buildings go up.

The day will come when Lagos will be a handsome city.



Moscow Plans New Air Terminal

The main terminal at Shermetyevo Airport, in operation for less than a year, no longer "meets up-to-date demands" of passenger traffic through the airport. G. Ilkin, chief architect of the design institute Aeroproyekt, made that point in announcing plans for a completely new terminal at the airport.

The new terminal will be a two-story reinforced concrete structure. Its second-floor waiting room will have an area of 32,280 sq ft. The long rectangular portion of the terminal may have a glass curtain wall framed in aluminum mullions.

Plans and renderings of the proposed terminal show that a circular observation and loading structure will be located at one end of the project. The round structure has been designed with a cantilevered canopy strikingly similar to the Pan American terminal at New York City's International Airport (ENR March 5, 1959, p. 30). But Aeroproyekt hasn't indicated how its canopy will be carried.

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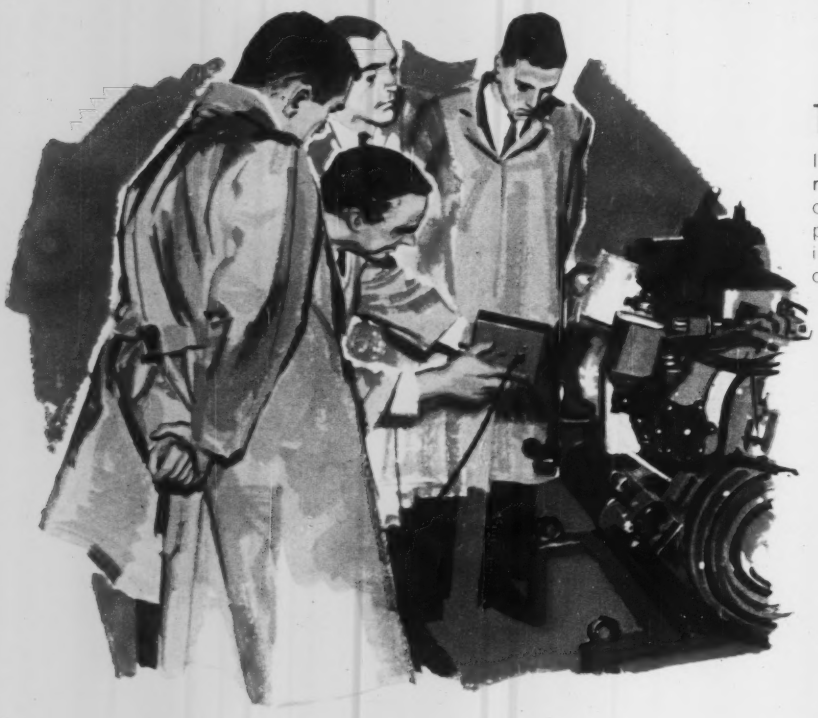

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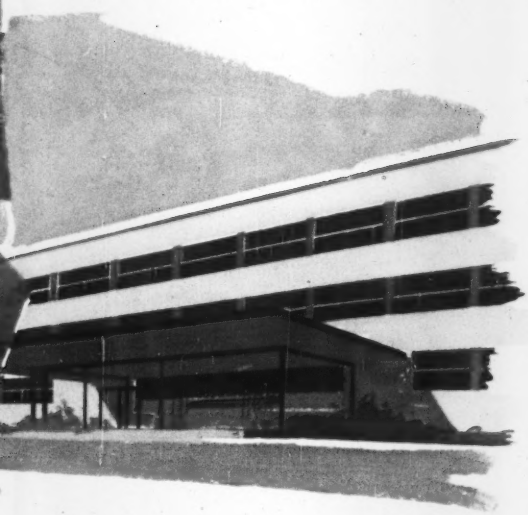

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	AMERICAN D&G Oils Premium S-1 level lubricating oil for diesel and gas engines.
Truck, Bus and Construction Equipment	**AMERICAN Diesel Fuel** Clean-burning premium diesel fuel.
	AMERICAN HD-M, S-1, S-3 Motor Oils Heavy-duty motor oils.
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	AMOCO Lithium Multi-Purpose Greases All-purpose greases.
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Rio's Big New Sewage Plant

A 19.8-mgd trickling filter sewage treatment plant, largest of its type in South America, is operating in Rio de Janeiro's Penha District.

The $1.5-million plant is presently serving 185,000 inhabitants, but by 1962 will have increased capacity to serve 400,000. It incorporates a smaller plant built several years ago.

Treatment is accomplished by screening and comminution, primary sedimentation and mechanical removal of sludge, filtration, secondary sedimentation, and chlorination when necessary.

The treatment process begins at two bar screens and grinders that remove coarse material, grind it and return it to the flow.

The sewage is then pumped to a pair of grit chambers, where particles with a specific gravity of 2.65 and diameters up to .08 in. are removed.

Flow then goes to a distributing tank, which also receives effluent recirculated from the filters.

The distributing tank empties into two primary settling tanks, where sludge and scum are removed. Retention time is 1 hr 45 min.

Primary sludge is pumped to digesters while effluent sewage flows by gravity to two trickling filters.

Effluent from the filters flows by gravity to a receiving well from which it is either recirculated or pumped to secondary settling tanks. Retention time in the secondary tanks is also 1 hr. 45 min.

At present, the plant has three sludge digesters, but only one is operating. Two small digesters, part of the original plant, are to be used as the plant's capacity is increased. A fourth unit is also planned to handle future expansion.

Presently, digester gas is burned, but eventually it will be used to heat the plant's laboratories. Effluent is discharged through a canal to Guanabara Bay. Sludge will either be burned or sold as a soil conditioner.

Peru to Develop Dam-by-Dam

Untapped power of Peru's Mantaro River could be the greatest single stimulus to economic growth for the South American nation, according to a recent report by an American firm.

A site at the Great Bend of the Mantaro River could yield an estimated 1.75 million kw. Another site downstream could produce an additional 1.5 million kw.

These findings were made by Arthur D. Little, Inc., economic consultants, Cambridge, Mass. The firm completed a report on the Peruvian government plan "Peru-Via," which maps the integrated development and colonization of east-central Peru.

The Mantaro River project is technically and economically feasible, according to the report. Although the project is in the area of the Peru-Via scheme, the hydroelectric plan does not depend on the over-all development for its success. The market for the power it would produce already exists on the coast of Peru.

Importance of the power project consists mainly in providing low-cost power for Lima, for irrigation pumping along the coast, for mining developments, and for such new power consuming industries as an electrolytic zinc refinery, and above all an aluminum refinery. Even without an aluminum plant, there is likely to be an adequate market, in fact a definite need, by 1968 for the first-stage power, 405,000 kw.

The report urges completion of an

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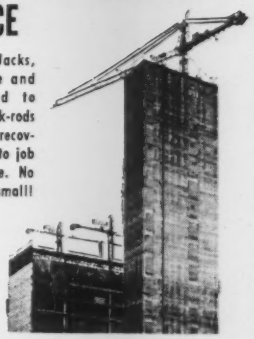

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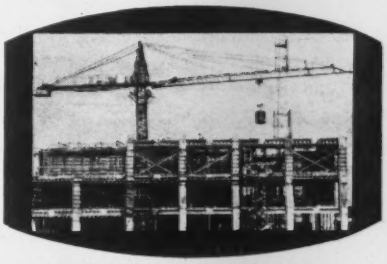

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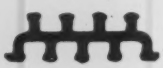

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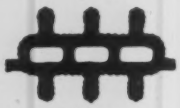

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engineering study of the Mantaro project by 1961 so construction can begin in time for a 1967 completion date.

Construction of highways, development of agricultural and forest resources, colonization of the Peru-Via region, and the introduction of industry are all part of the integrated plan. The report recommends that the plan be carried out in stages—one region serving as a stepping stone to the next. The logical starting point for the development is the Apurimac region—the valleys of the Mantaro, Ene, Perene and Tambo rivers. Later developments are projected for the region of the Urubamba River. In all, the development program would reach an area of some 36,000 square miles.

$10-Million Causeway Link Urged for Peruvian Island

A $10-million bridge and causeway linking the island of San Lorenzo with the mainland at Callao has been recommended to the government of Peru by Christiani & Neilsen, Copenhagen engineering firm.

A recent C&N survey advises construction of a 1.3-mile causeway or rock mole starting from La Punta, a peninsular section of Callao, with a 1-mile bridge connecting the causeway with San Lorenzo.

Construction of the span will make 988.4 acres of land available for industrial and residential expansion of the Greater Lima area. Lima, the capital, is immediately east of Callao.

C&N recommends construction of the causeway and bridge initially for only two lanes of traffic and a footpath, but with foundations capable of accommodating two additional lanes of traffic. The report estimates this bridge would handle 500 vehicles per hour in each direction. With two lanes added later, capacity would rise to 1,350 per hour.

Dutch Will Build Tunnel Under North Sea Canal

The Netherlands will begin construction this summer of a $12.5-million, 4,210-ft vehicular tunnel under the canal that links Amsterdam with the North Sea.

The Dutch will use the trench tunnel, with reinforced concrete sections 295 ft long. The tunnel will have two 30-ft roadways separated by a ventilating shaft. The top of the tunnel will be level with the bed of the canal.

Construction will take four years. Before it is completed, the government will begin a second, similar tunnel under the canal.

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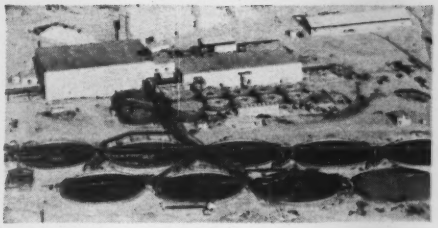

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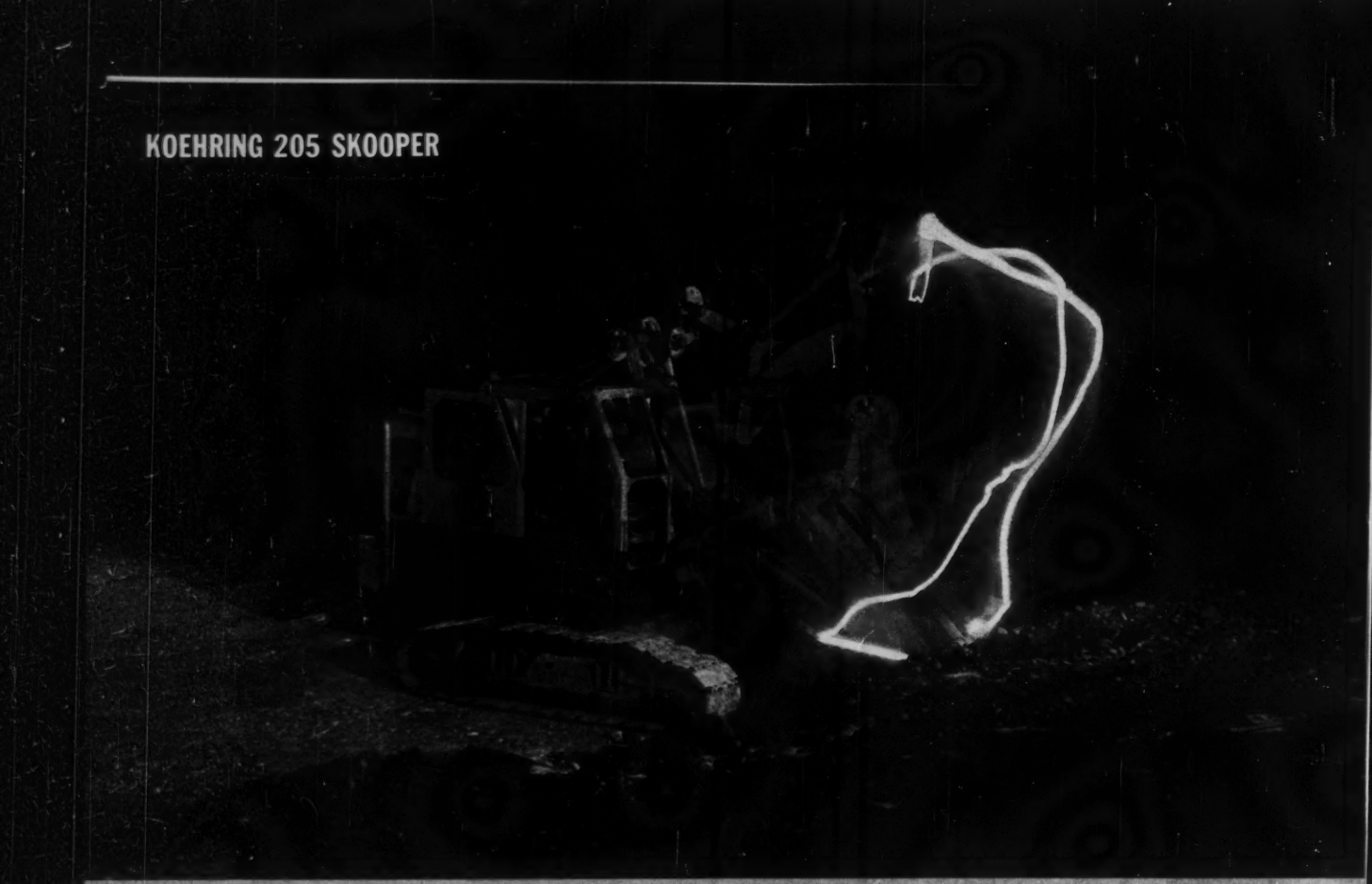

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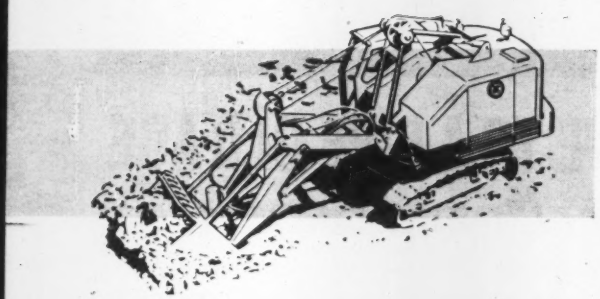

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Driving Simulators Aid in Road Design

Development of an arsenal of driving simulators to pre-test highway designs and traffic control devices should have priority in the field of highway research.

That was one of the conclusions of a three-day National Conference on Driving Simulators held recently in Santa Monica, Calif. Such systems should be developed as quickly as practicable to avoid "imbedding in concrete" errors in design that later may prove to be inefficient or even potentially dangerous to motorists.

Driving simulators are devices that can imitate actual sensations of road conditions and traffic situations. Scientists can then measure driver performance or reaction to various conditions.

The U. S. Bureau of Public Roads, Automotive Safety Foundation and U. S. Public Health Service joined in sponsoring the conference, which was attended by highway and traffic engineers and simulator experts.

The simulator experts, many of whom have been designing such devices for use in the study of supersonic aircraft and space satellites, said several problems posed by the engineers are logical subjects for pre-testing with simulators. These included determination of:

- Efficiency of various at-grade intersection designs.
- Efficiency of alternate interchange and ramp designs.
- Effect of various combinations of highway lighting.
- Reaction of motorists to different signs, signals and pavement markings.

Describing the interest of highway engineers in simulators, E. H. Holmes, BPR's assistant commissioner for research, said:

"Any highway of itself could be a laboratory permitting observation of hundreds of motorists. Unfortunately, we can not set up on a real highway the controls we need to determine precisely the effect of this or that single design element.

"With simulators we can control all of the factors in a traffic situation and thus determine the real efficiency of design elements and specific traffic systems. In short, driving simulators can tell us things which we might otherwise learn only through sad experience—accidents and traffic jams, for example.

"We're confident that development of special simulators for our needs will produce highways which are more efficient capacity-wise, as well as safer."

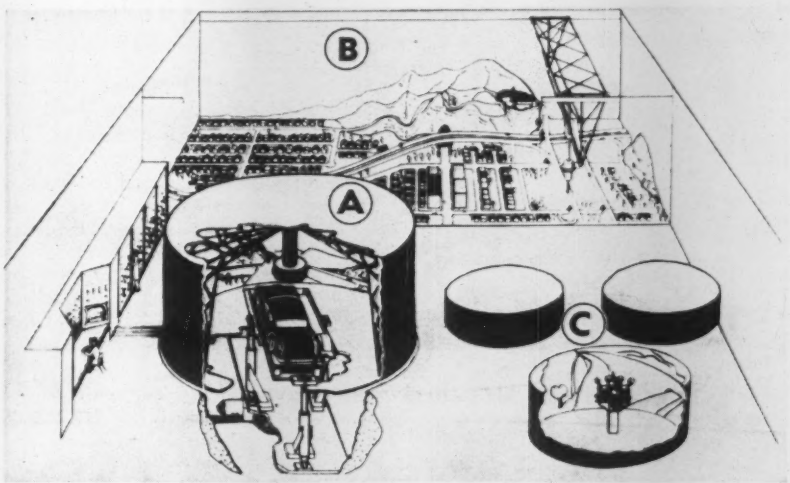
J. O. Mattson, president of the Automotive Safety Foundation, said, "Use of the simulator will enable us to reproduce a traffic situation over and over again. It will allow us to study crisis and near-crisis situations and driver reactions to them."

Mr. Mattson said that knowledge gained could be applied in driver education, driver testing, traffic control and traffic law enforcement.

The most advanced driving simulator is one developed and in use by the Institute of Transportation and Traffic Engineering, University of California at Los Angeles (see below).

Scientists at Cornell University, working under a grant from the U. S. Public Health Service, have designed a complex, "high-fidelity" simulator in which a person would drive through traffic situations depicted on a screen completely surrounding the automobile. Traffic situations would be images transmitted through a closed circuit television system from scale models. Mechanical devices simulating vibrations, forces of inertia, noise and other elements a driver would experience on a real highway would create a powerful illusion of reality.

Development of a driving simulator is one of the top priority items for future research listed by the Highway Research Board last year (ENR, June 23, 1960, p. 128). Expenditure of $3½ million for this purpose was recommended by the research group.



ARTIST'S CONCEPT has (A) simulator (B) model traffic scene and (C) projectors.

UCLA's Sophisticated Simulator

The driver in the 1961 automobile speeds up as he enters the freeway, switches lanes, goes up a hill, worries about the bumper-hugger in back, and turns onto a side ramp.

It's a routine ride—except that the car is on a treadmill, the road is on a movie screen, and the driver's every action is being recorded on instruments of UCLA's driving simulator. The simulator is part of a long-range effort by a research team in UCLA's Institute of Transportation and Traffic Engineering to study the whole complex of traffic problems—safety, driving performance, and system design.

Two years ago, researchers began phased development of a driving simulator. At present ITTE's team is designing instruments and running tests to make the device as close to the real thing as possible. Ultimately, it hopes to develop a full-scale laboratory in which every aspect of driving can be tested objectively.

(*Please turn the page*)

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To attain this final degree of realism may take five years of design and experimentation and will require a large and intricate testing facility.

But even while perfecting the simulator, the ITTE team is carrying out important tests on driver behavior and road design. One study, on highway signs, had drivers read signs as they whizzed by in a moving picture. Findings in this work have been used by the California Division of Highways in developing a new sign design that cuts down the number of reading errors.

The cab of the driving simulator consists of a standard station wagon on a treadmill of steel rollers, facing a 10-ft high semicircular screen in front and with a small screen on the car's rear window. Movie projectors throw traffic scenes on both screens and a battery of instruments record the slightest change in steering wheel movement, acceleration, braking, the driver's breathing rate and his emotional stress.

During the past year the team has concentrated much of its effort on a "tilting chair"—a driver compartment mock-up—to test the instrumentation and systems that will be built into the simulator. These will include a hydraulic system that will provide car body lean when the driver takes a curve on the filmed road, forward pitch when he stops and jolts when he hits a chuck hole.

Also ready for installation is a four-projector movie system, coordinated in such a way that the filmed road scene will change as the driver switches lanes or turns off the road.

Ultimately, an even more sophisticated feed-back system is planned. This will include a scale-model scene with moving vehicles, one carrying a small TV camera, which will send an image of the traffic scene back to the driver of the simulator vehicle.

With these refinements, the driver will confront what the engineers call "an unprogrammed sequence of events." This is in contrast to the programmed events presented by simulators used for driver-training classes. In these classroom simulators, the motion picture film keeps rolling even if the driver turns off the road or stops. With the feed-back system, the scene changes, just as it would on the road.

The team's over-all aim is summed up by Prof. J. H. Mathewson, assistant director of the Institute and leader of the research team. "At present we have no really adequate criteria for proficient or safe driving. Without these, how can we be sure that our highway designs are the best? How do we know what makes for safe driving or who is a safe driver? Or how can we hope to improve the standards for driver licensing, teaching high school students to drive, or designing highways, signals, signs, cars and so on?

"With the Institute's simulator, we think that we can go a long way toward providing basic facts about driver behaviour. These facts should lead to a vastly better design of all elements of the driving environment."

Much of the present simulator work is supported by a three-year grant from the U.S. Public Health Service. The research team consists of, besides Mr. Mathewson, Slade Hulbert and Albert Burg, research psychologists, and Charles Wojcik, research engineer.

Germany Gets Low Marks On Highway Research Work

West Germany, which ranks second only to the U.S. in expenditure for highway construction, invests less than $300,000 annually in highway research. This is less than the government spends on tobacco research.

Delegates to a recent German Highway Research Board convention in Berlin complained that the government spends $1 billion a year on highway construction, maintenance and administration and only 0.03% of this goes for research.

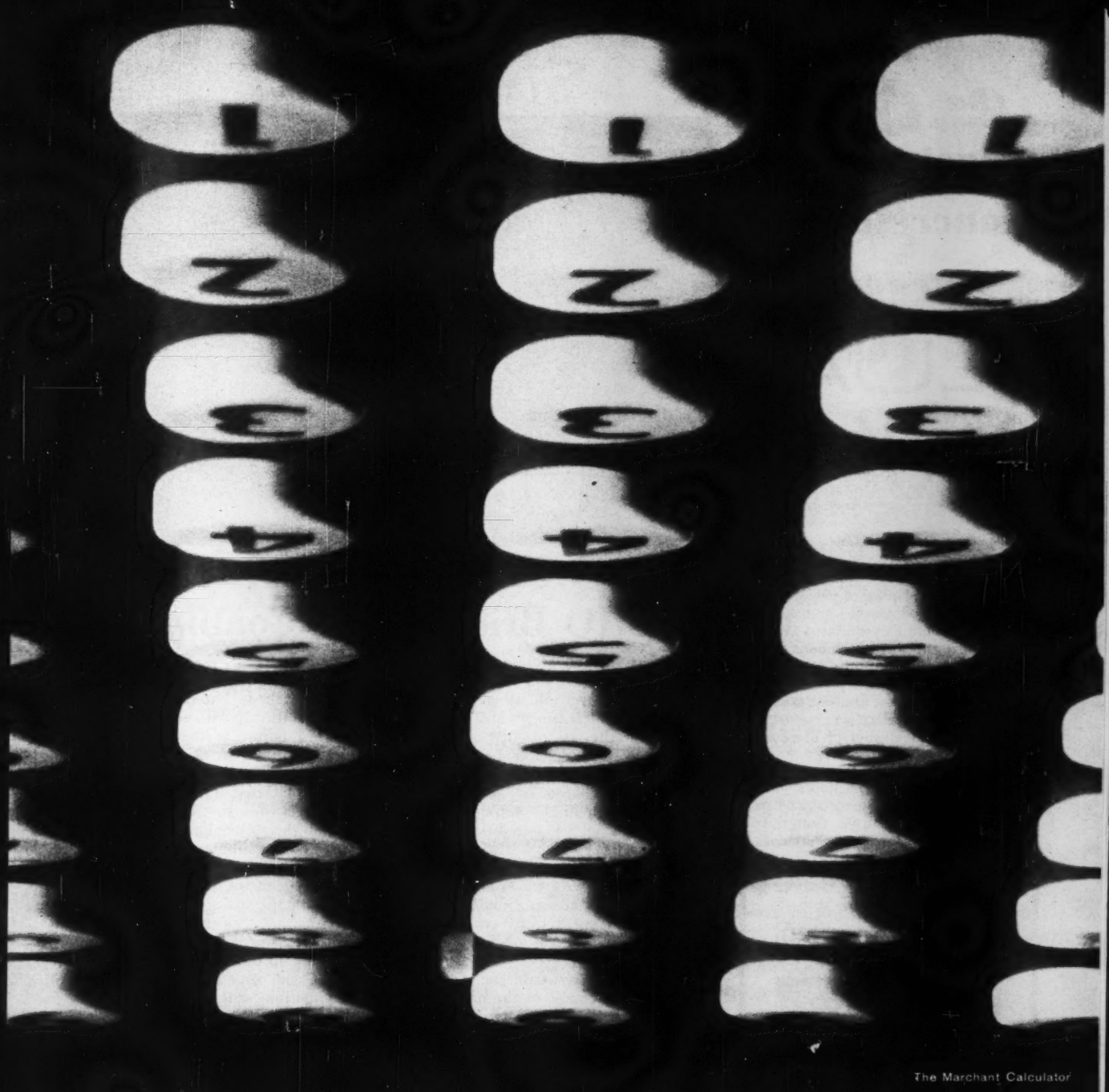
West Germany's Minister of Transport, Hans-Christoph Seebohm, told the convention that there was little hope for expanded financial aid for research in the near future. He announced, however, that recent legislation would enable Germany to spend more on highways than all the other countries of Europe combined.

PHS Finances Research on Sewage Treatment Methods

Dow Chemical Co.'s Industrial Service Div. will study new and unconventional sewage treatment methods under a contract awarded by the U. S. Public Health Service, Division of Water Supply and Pollution Control.

The contract is the first in a series that will be awarded to university and industrial laboratories as part of an advanced sewage-treatment program. Among the methods to be investigated are separation of impurities by foam fractionation, freezing, gas hydration, adsorption, and other advanced processes.

The program fills the prescription of the Surgeon General's Water Pollution Control Advisory Board, which called for investigation of new techniques of pollution control.



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AASHO Bridge Tests Continue

When test traffic ground to a halt last fall on the $27-million AASHO Road Test near Ottawa, Ill., several of the slab-and-beam test bridges still survived.

Two of the 16 original structures suffered excessive deflection early in the program (ENR Oct. 23, 1958, p. 24). They were replaced by structures of different design in the spring of 1959. The remaining 14 test bridges were subjected to 550,000 truck passages during the two-year, 17-million mile marathon.

The beams of all spans under the test traffic underwent selected stress levels considerably in excess of standard design stress.

Although many data accumulated, researchers in charge of the bridge tests wanted additional information on the structural behavior of the bridges.

The fatigue strength of the test spans is one of the major objectives of the research program. So, accelerated fatigue tests are testing certain bridges, either to failure by fatigue or to one-million applications of the average stress to which each structure was subjected during the regular test traffic.

Several spans are being subjected to a limited number of passages of vehicles with loads greater than those used during the regular test traffic. Maximum loading during the regular tests was 30,000 lb on a single axle and 48,000 lb on a tandem axle.

Heavy military vehicles and heavily loaded earthmoving scrapers are playing a part in this second phase of the special tests. The loads are applied with successively heavier vehicles, for each 50 passages, until the spans fail or until the load-carrying capacity of the vehicle is reached. Those bridges surviving this treatment will be loaded statically until failure, with 2,500-lb concrete blocks used in the regular truck traffic tests.

The accelerated fatigue tests were carried out with a mechanical oscillator placed on the spans along with concrete blocks. This combination of load and impact excited the bridges to near their natural frequencies, approximating the behavior of the spans under the regular test traffic.

Under the regular test traffic, the 30-mph truck speeds produced an average of one load application per minute. By comparison, the natural oscillating frequency of the bridges ranged from 2 to 5½ cycles per second. Consequently, the mechanical oscillator induced stresses in the bridges from 120 to 330 times as fast as the truck traffic.

All 18 test bridges are 50-ft single spans consisting of three beams, or girders, and a deck slab carrying one traffic lane. There are three types: structural steel, reinforced concrete and prestressed concrete.

Official reports on the bridge experiments—as well as on the test pavements in the program—will be published by the Highway Research Board of the National Academy of Sciences-National Research Council as seen as all the data are evaluated.

Ivan M. Viest is bridge research engineer at the project and John W. Fisher is his assistant. W. B. McKendrick, Jr. is project director.

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Suddenly—after 60 Years

. . . there's a *completely different* way to mix concrete — a new machine whose advantages are so numerous that the chances are it will make stationary mixers as obsolete as horse collars in a few short years. And, it's so simple that men seeing it for the first time must say, "Now, why didn't I think of that?"

This new type of machine is the Turbine Mixer, manufactured by The T. L. Smith Company of Milwaukee, Wisconsin. Its operation is unique, but not unusual. The bowl is not a drum, but a doughnut-shaped pan, open at the top. A motor mounted in the doughnut's hole sends a series of paddles whirling around in the doughnut's ring at speeds as high as 600 feet-per-minute.

The ingredients for concrete can be dumped into the mixer anywhere around the circumference, instead of through a narrow throat . . . so charging is incredibly fast. When the mixer is turned on, completely homogeneous mixing is accomplished almost as soon as it is begun: capacity loads of almost every type of concrete are thoroughly mixed in about 30 seconds, and dumped in about 10.

Small wonder, then, that the Turbine Mixer promises a revolution in concrete mixing!

As if this weren't enough, however, the new mixer has an outstanding advantage where most money-conscious people can see it best: price. The Turbine Mixer costs less on every count than any other mixer of equal capacity.

Size-for-size, it costs less to purchase. It is very compact — even the largest size, which can turn out 180 yards of concrete an hour, only comes to a man's chin — so it costs less to install (height costs money in *any* kind of structure). It is vibration-free, so it doesn't need any kind of massive base or frame to hold it in place.

It costs less to erect a new mixing plant with a Turbine than with any other kind of mixer — and it costs less to replace an old mixer, too. And if it *is* used to replace an old mixer, the Turbine will not only fit easily into the space, but will substantially increase the plant's capacity.

The Turbine Mixer also possesses a versatility not previously possible in concrete mixing. It can be used to mix *every* kind of concrete, from the earth-moist type used in block making, through the 1-inch slump requirements common in today's inspection-type concrete, to 6-inch slump, and even slurry and grout.

This versatility becomes doubly important since the Turbine can be equipped with four separate discharge doors to discharge in four different directions. Thus a single unit can conceivably serve as a ready-mix plant, feed a gob-hopper for blockmaking, charge pipe machines, and supply a pre-stress yard — all from one location.

In Ready-Mix, the Turbine is opening up the proposition of central-mix to many operators who just couldn't afford it in the past since the Turbine can frequently be installed in existing plants without structural alterations.

On paving spreads, the Turbine Mixer is light enough to be easily portable, yet sturdy enough to stay in constant service feeding a fleet of truck mixers or agitators.

On job-site locations, such as missile bases, the Turbine is inexpensive, easy to install, easy to operate, and can be readily transported to a new location when the job is finished.

As the use of concrete increases, so, we predict, will the use of Turbine Mixers. Just as the Model T spelled doom to America's harness-makers, so will the Turbine replace other stationary mixers.

NF
name's
NEENAH
and
the
products
are
GRAY and
DUCTILE
IRON
CONSTRUCTION
CASTINGS
of finest
QUALITY
FINISH
UNIFORMITY

Delivery is prompt: we have huge on-hand stocks of standard items

PLUS

15,000 patterns

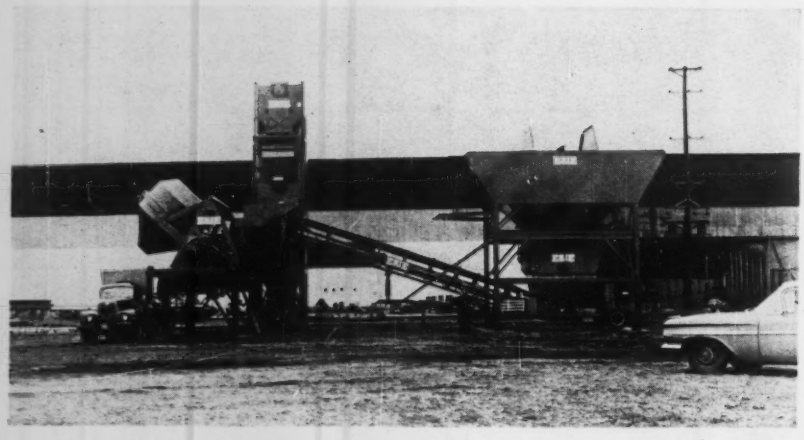
PLUS

a daily production capacity of 500 tons in our two plants.

Name's Neenah . . . if we make it it's a casting . . . and the best.

New 168-page catalog shows our line. It's sent promptly when requested.

NEENAH FOUNDRY COMPANY
NEENAH • WISCONSIN
Chicago Office
5445 North Neva Ave., Chicago 31, Ill.



Portable Batcher Breaks Record

A portable central mix concrete plant with a capacity of 215 cu yd per hour is the largest portable model ever to be built, according to its manufacturer, Erie Strayer.

The plant, whose components are mounted on pneumatic tires, can be dismantled at one work location, moved to another site and put back into operation by a five-man crew within two eight-hour days, the producer says.

Three basic units make up the plant—a 6.2-cu-yd mixer, and aggregate batching unit with a 100-cu-yd bin capacity and a cement batching unit with a 425-bbl batching bin and a 600 bbl ground storage silo.

The plant breaks down into four components that are designed to maximum road height (13.5 ft), width (11 ft), and length (40 ft), to meet most state highway travel permit regulations.

A special, low-slung trailer carries the mixer with 75-hp motor and starter, the control panel for the entire plant, a water meter, a 500-gal water tank and pump, an air compressor, the power entrance panel and a hydraulic power unit for tilting the mixer into position.

The aggregate batching unit has a three-compartment bin hopper, a 7-cu-yd batching section with automatic scale and a 48-in. conveyor belt that delivers weighed aggregates as rapidly as the mixer can take them.

The cement batching unit is equipped with a factory-installed aeration system, high and low level indicators, running gear and a 49-cu-ft batcher with an automatic scale system.

Advance preparation for erection of the plant includes placement of concrete pads for each of the three units and erection of a 5-ft 4-in.-high steel framework on which the mixer is placed so that it can dump into trucks. Once it's assembled, one man can operate the plant. Erie Strayer Co., Erie, Pa.

Water Purifier Stews Bacteria

A compact unit that purifies water at the rate of 20 gal per hour operates at a cost of 20 cents per day, according to the manufacturer.

It does not remove salt or chemicals but kills bacteria with heat, then cools the water for immediate use. The unit weighs 320 lb and measures 28x36x35 in. It operates on 115 v, 60 cycle ac with a total current demand of 20 amp.

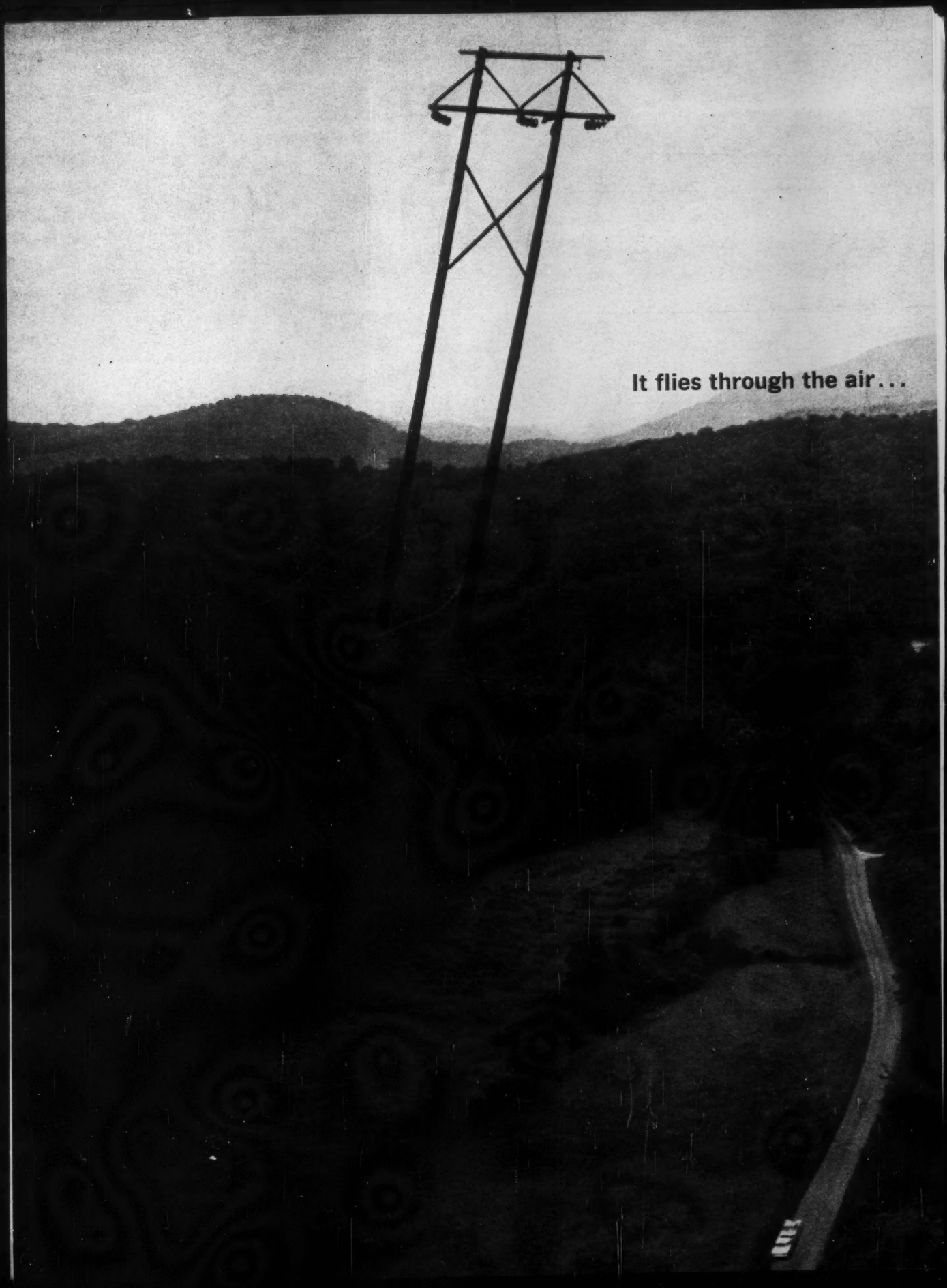
Its operation is simple. Water from the source of supply (filtered surface water or polluted well water) flows through a check valve and an exchanger to the suction side of the pump.

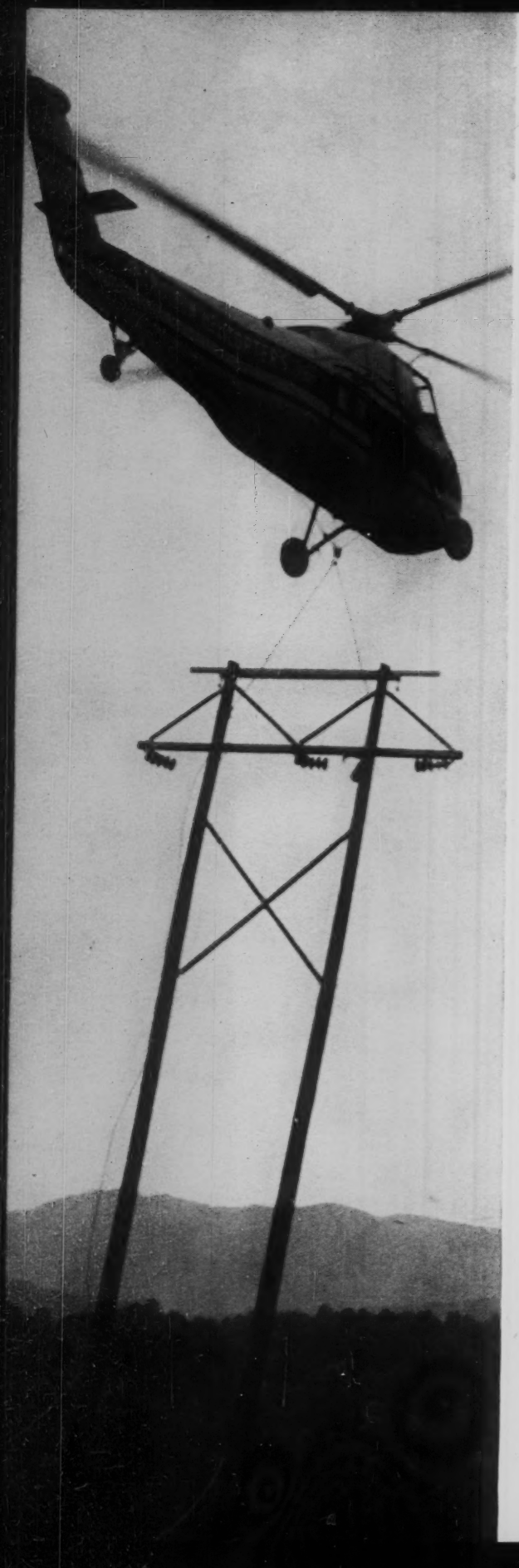
From the pump the water flows to the electric heater, then through a globe adjustment valve to a 30-ft heat retention coil.

The water then contacts a thermostat switch. If its temperature is less than 161 F, it is diverted by a three-way solenoid valve back to the pump and back to the heater.

If the temperature exceeds 161 F, the solenoid valve is energized and the water flows to the storage tank via the heat exchanger where it gives up its heat to the incoming water and is cooled to within 10 deg F of the temperature of the incoming water.

Tentative selling price of the water purifier unit is $650 fob Escanaba, Mich., exclusive of the storage tank and pressure switch, which shuts off the unit when the tank is filled. Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.


It flies through the air...



Setting H-frames in pre-dug holes along right-of-way, helicopter acts as an airborne crane.

at the lowest of costs

American Electric Power Demonstrates New Helicopter Construction Methods... Cuts Construction Time to One-Third

In a history-making experiment in power line construction, American Electric Power Company put a Sikorsky helicopter to work in virtually all phases of power line construction with results that point to a prominent new role for helicopters in the near future.

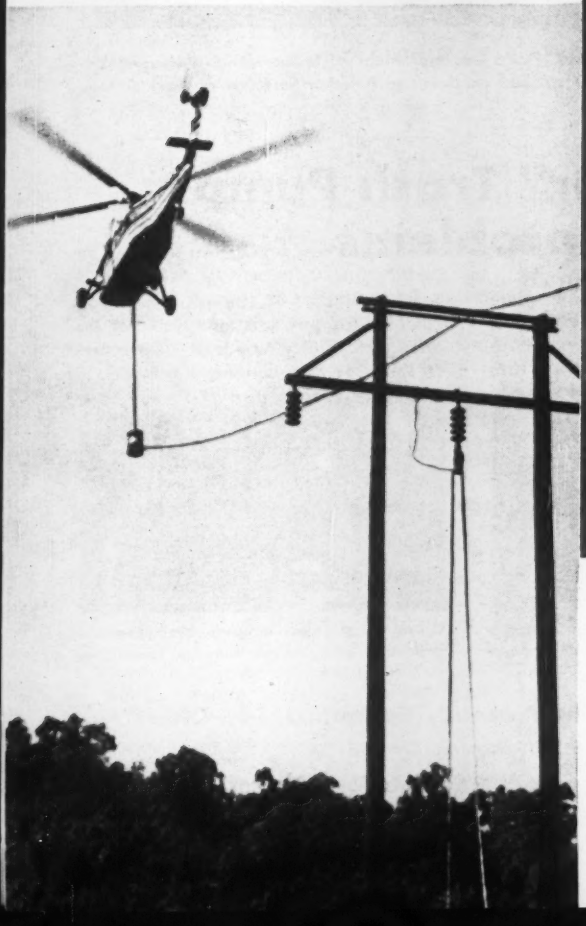
For the first time, a construction project was planned from the start to take advantage of the helicopter's unique abilities . . . as a go-anywhere truck . . . as a flying crane . . . and as a high speed cable stringer. During the course of the six-week operation, the helicopter chalked up records like these:

On its first morning in operation, it transported all the steel for 4.5 miles of right-of-way—a total of 268,000 pounds of steel for 17 towers—from staging areas to tower sites in just 4½ flying hours. Conventional methods would have taken three weeks. In erecting steel towers, the helicopter demonstrated it could help crews raise two 60-foot side panels in an average of 14 minutes—normally 30 man-hours of work. Used as a flying cable stringer, the helicopter strung 121,000 feet of winch cable in just 4½ hours.

In total, the operation was cut to one-third the time it would have taken using ordinary methods. Two lines, totaling 29 miles, were constructed. Helicopter and pilot services were furnished to Appalachian Power Co., A.E.P.'s subsidiary, by Petroleum Helicopters, Inc.

As a result of the helicopter's outstanding success in this project, the Sikorsky S-58 is expected to play an important part in the construction of several 345kV lines now being planned.

(above) Erecting assembled panels is another flying crane operation. Panels go up in as little as two minutes. (below) Cable stringing: helicopter unspooled 9,600 feet per flight. In a typical 4½-hour period, 121,000 feet were strung.



A look at the future. In the first demonstration of its kind, a completely assembled tower is flown to site and bolted to footings. Entire operation from staging area to final bolt took just 10 minutes. Assembled with guys, experimental aluminum V tower for 138KV line weighed 2,900 pounds.

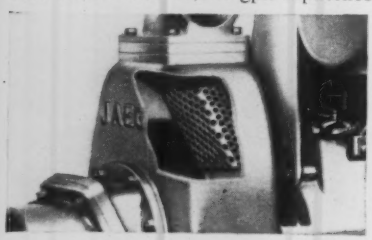
SIKORSKY AIRCRAFT Stratford, Connecticut
Division of UNITED AIRCRAFT CORPORATION

BEFORE: Jaeger 3" Trash Pump removing very dirty water. Note discharge stream. 3" model pumps 20,000 gph, 4" model pumps 46,000 gph @ 10' suction lift. Give you big capacity *plus* ability to handle trash.

AFTER: Pump on repriming cycle handling seepage. Unclogged strainer continues to function perfectly on mud bottom.

New Jaeger "PosiJector" Trash Pumps lick dewatering problems

• First self-priming centrifugals that *pass and positively eject trash.*
• *No more clogged strainers.* Now you can use Jaeger's *big-opening* strainer that passes leaves and sticks.
• *Safely pump trashy water* with Jaeger heavy 2-bladed impeller that passes up to 2" diameter solids.
• *Positively discharge the trash* with revolutionary Jaeger "PosiJector." It prevents recirculation of solids *and channels them into the discharge flow from the pump.* No other trash pump has this essential feature.
• *Entire suction chamber quickly removable* for periodic cleaning and inspection or adjustment of liner plate and impeller. Another Jaeger exclusive.
• *Ideal for all dewatering work:* With their 20,000 and 46,000 gph capacities Jaeger 3" and 4" trash pumps are *efficient* for any job and *essential* on dirty jobs. Call your Jaeger distributor or send for new Catalog PT-1.



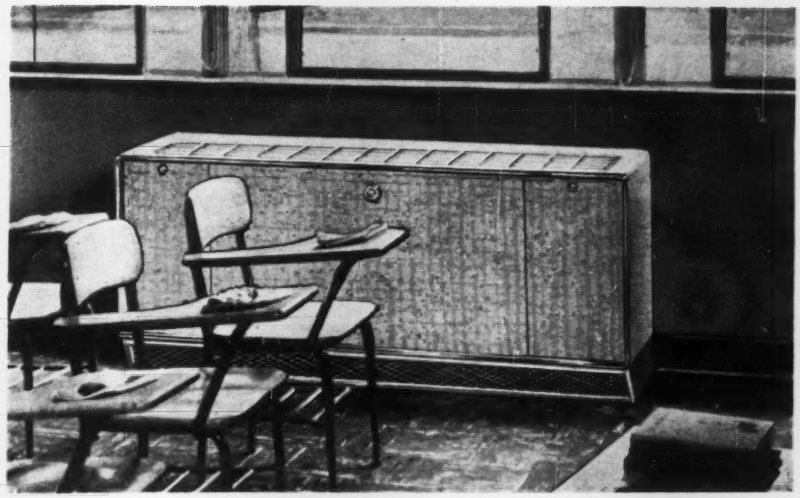
"PosiJector" prevents recirculation of solids that wear and clog other pumps. (Pat. Pending)

Quick, easy access to pump, liner plate and impeller. Entire suction chamber removable.

THE JAEGER MACHINE COMPANY, 200 Dublin Avenue, Columbus 16, Ohio

Jaeger Machine Company of Canada, Ltd., St. Thomas, Ontario

World wide sales and service through Jaeger International Corp., Apartado 137, Panama, R. P.



Heater-Ventilator for Schools

The Modine School-Vent departs from traditional methods of controlling heat levels by regulation of steam or water temperatures. It controls room heat by damping interior and exterior air flows.

A face-and-bypass insulated damper directs air either through or around the heating coil. An insulated anti-wipe damper permits complete isolation of air currents from the heating coil, when the damper is fully closed. And indoor and outdoor dampers blend fresh and recirculated air.

The vent system works like this:

- When rooms are unoccupied, heating is by convection, but the fan cycles for short periods to recirculate interior air. The exterior damper is closed, all others open.
- For morning warm up, the fan runs until the room temperature reaches the daytime setting. Dampers remain in the nighttime position.
- As the temperature rises when the room is occupied, the outdoor damper opens to admit fresh air, and face-and-bypass and anti-wipe dampers adjust to maintain desired room temperature.
- When necessary for cooling, all dampers close, except the one for fresh air. Recirculating air is then cut off, and incoming air is not heated.

By using centrally chilled water—instead of steam or hot water—the Modine vent also acts as an air-cooling unit.

According to the manufacturer, the new system not only gives pinpoint control in crowded rooms, but it also offers "system economies of at least 33% over present-day techniques."

Although the vent was designed especially for low-budget classrooms, related applications include hospitals, motels, office buildings and hotels.

The fan has a quiet two-speed motor isolated by rubber pads, and fans are run at low rpm.

Maintenance is simplified by push-button lubrication, hinged control panels that open with key-lock latches, and slide-out filters.

Exterior cabinets of room units are made of 16-gage metal. Surfaces are finished with baked-on enamel, in choice of six colors. And front panels are covered with vinyl.

Five sizes, from 500 to 1,500 cfm, are available. Depth of vent is 13⅝ in., height 28 in., lengths from 60 to 108 in. Vents may be surface mounted or partly or completely recessed. Modine Manufacturing Co., 1500 Dekoven Ave., Racine, Wis.

King-Sized Crushing Plant Handles 14-in. Boulders

What is said to be the largest portable duplex crushing and screening plant in full field operation uses a 1536 jaw crusher in balance with a 40-in.-dia x 30-in.-wide roll crusher.

The huge machine takes boulders up to 14 in. and turns out as many as three sizes of material. It uses a high speed, 5x14-ft, 3-deck vibrating screen that has 70 sq ft of specification deck. The product deck can be changed without removal of top deck, and the second deck screen cloth may be removed from either end.

For increased travel ease, the rear assembly (including the 90x28-in. bucket wheel and hopper) may be quickly detached without the use of a crane. Pioneer Engineering, Division of Poor & Company, Inc., 3200 Como Avenue, Minneapolis 14, Minn.

SEALTIGHT®

ELASTOMERIC
BUTYL CAULK

Available in Gun Cartridges and

Bulk Containers for Troweling

...an all-purpose single component sealant.

Sealtight Elastomeric Caulk is a new single-component sealer that offers most of the important qualities of the more costly two-component polysulfide sealants *plus* many additional advantages. It is an all-purpose sealant that can be used on any reasonably clean surface—porous or non-porous. It is a premixed single component material ready for use with no on-the-job preparation. Sealtight Elastomeric Caulk is ideal for sealing curtain wall joints, tuck pointing masonry, caulking concrete, channel glazing, and general caulking purposes.

OUTSTANDING FEATURES . . .

- Single-component, premixed ready for use.
- Offers indefinite storage life.
- Non-bleeding and non-staining . . . does not require a primer.
- Virtually unaffected by freeze-thaw cycles.
- Resistant to ozone and ultra violet exposure.
- Dries tack-free in 4 to 6 hours . . . cures in 30 to 60 days.
- Available in four colors: white, natural, grey, and aluminum.
- Fibre tube features no-flow device.

WRITE FOR COMPLETE INFORMATION

W. R. MEADOWS, INC.

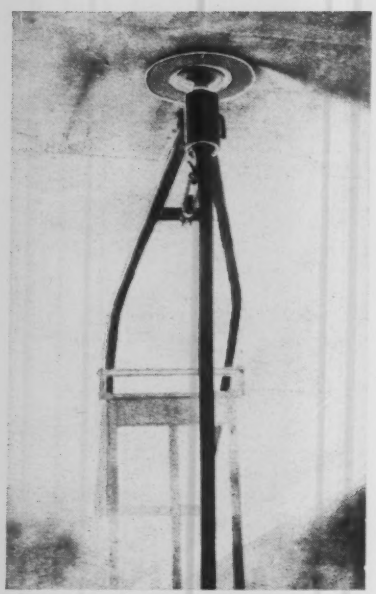
16 KIMBALL ST. • ELGIN, ILLINOIS

New Way To Finish
CONCRETE CEILINGS

More and more building specifications require finely finished concrete ceilings. Because of this new requirement, Stow Manufacturing Co. has developed the Stow CG Ceiling Grinder—a special machine designed to grind off form marks and fins, cut off nails, and smooth the entire surface.

With this machine, one man can average 4,000 square feet per day. Simple to operate, it pushes along like a baby carriage.

To operate the Stow Ceiling Grinder: (1) The operator first sets the pivot arm at about a 45° angle, then adjusts the grinding disc to proper height by lifting up on the rubber-gripped handle in the center. A ratchet arrangement automatically locks it in position at the desired height. (2) A slight pressure is exerted on the grinding disc by the spring and chain assembly at the opposite end of the pivot arm. (3) A turn-buckle is used to adjust the wheel to the most desirable angle for grinding. For ordinary grinding, the disc should be flat against the ceiling, but for cutting nails and removing fins, it works better at a slight angle. A spring arrangement built into the bearing housing supports the grinding disc and absorbs shocks, thus preventing any gouging. Once the machine is adjusted, the operator just pushes it along.



FOG OF CONCRETE DUST

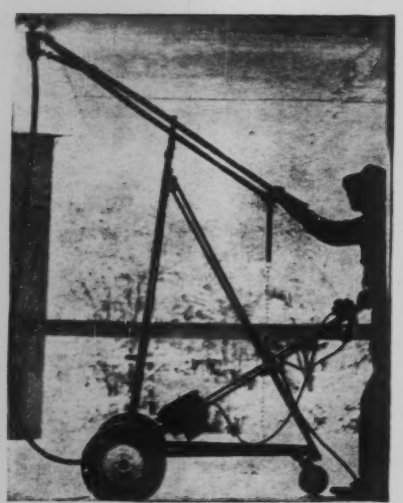
Three models are available:

CG 10—for ceilings 8 to 10 ft high
CG 13—for ceilings 10 to 13 ft. high
CG 16—for ceilings 13 to 16 ft. high

All three models have a 1 HP totally enclosed motor operating at 3450 RPM. The disc is a 9" Bayflex of cotton fibrous material with a silicon carbide abrasive bonded with resin.

The Stow CG Ceiling Grinder can also be used for grinding walls by attaching a handpiece or anglehead to one end of the flexible shaft.

Stow Manufacturing Co. makes a complete line of portable electric flexible shaft grinders for both wet rubbing and dry grinding walls. Send for your copy of Stow's Concrete Grinding pamphlet, which gives the proper speeds for both wet rubbing and dry grinding. For more information on Stow Concrete Grinders contact your Stow distributor or send in the coupon below. Stow Manufacturing Co., Binghamton, N. Y., makes a complete line of concrete vibrators, rotary trowels, screeds and grinders.



STOW CG CEILING GRINDER

STOW MANUFACTURING CO.
19 Shear St., Dept. H-1, Binghamton, N. Y.
Please send me your pamphlet on Grinding Concrete.

Name..... Title.....
Company.....
Street..... City..... State.....

. . . New Products

Line of Submersibles Has Motor Protection Built In

Two models in a line of submersible pumps have a device which the maker says protects the pump motor.

It consists of heat-sensitive elements built into the stator windings and coupled in series with a contactor inside the pump.

If the motor begins to overheat because of incorrect direction of rotation, phase breakage, a blocked impeller or because the pump has been running dry for too long or has been overloaded, this device stops the pump automatically. When the motor returns to normal operating temperature the pump starts again.

Both models, the Weda L203 and L205, are completely submersible. Double protection against water seepage is provided by shaft seals and a stationary sealing sleeve between the rotor and stator.

The L203 has a maximum capacity of 370 gpm and can develop a 26-ft head. The L205 has a maximum capacity of 190 gpm and a maximum head of 60 ft. Both models weigh 55 lb. The electric motor supplied is a three-phase, 1½-hp unit that operates on 440/220 volts or 500 volts.

The same maker also offers a drainage pump that weighs under 100 lb. With this pump they offer the same built-in motor protection. At a head of 20 ft, this pump can pump 315 gpm. This model, called the Weda L3Z, can pump water with a high percentage of solids—up to ⅞ in. It is available with a 6 hp motor, 440/220 volts, 60 cycles or 550 volts, 60 cycles. Pumps are made in Sweden by Wedaverken for Motoramic Inc., 2120 Market St., San Francisco 14, Calif.

Polyvinyl Inner Linings Seal Seeping Wood Tanks

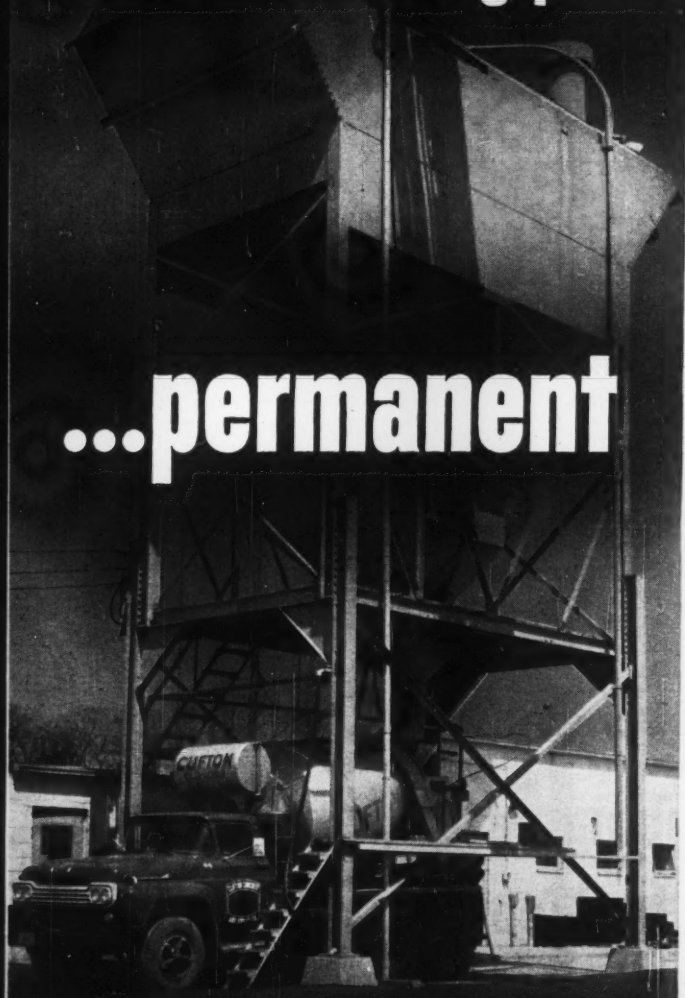
Redwood water tanks in several California towns are being dressed up with plastic linings.

Water officials chose the plastic to stop leakage which not only caused a loss of water but also resulted in unsightly water stains.

The plastic is expected to last indefinitely because it is resistant to mildew and impervious to water, brine and most chemicals. The linings vary in size from 2,000 to 3,000 sq ft. They are 0.012 in. thick.

Globe Linings, Inc., Long Beach, Calif., supplied the linings, which were fabricated from Koroseal polyvinyl, made by B. F. Goodrich Industrial Products Co., Los Angeles, Calif.

which batching plant is best for you?



...permanent

...portable

...or mobile?

Production requirements, site, location, and type and size of operation — these variables make every batching plant a custom job. The best plant for you, then, is the one best-suited to your specific needs. This is where Heltzel can help you in two important ways.

First, Heltzel has engineered and constructed thousands of batching plants. This "drawing-board-to-finished-plant" know-how has produced efficient, custom-engineered plants and lower cost-per-yard concrete for contractors, transit mix and products plants.

Second, with Heltzel you can choose from a wide variety of accurate, fast-operating portable or permanent plants built from a complete range of standard bins, batchers, controls, scale equipment and related components.

HELTZEL PLANTS — Permanent or portable. Available in capacities from 30 to 1,000 tons, or larger. Heltzel portable units are constructed in 2 basic sections plus columns — for over-the-road transport. Ideal for job-site batching, they are quickly and easily erected or dismantled. For greater convenience, portable plants can be furnished as factory-assembled unitized plants, with batchers, scale equipment, and all controls in place, and snap-in connectors on all power connections.

NEW SELF-ERECT MOBILE PLANTS — The first self-elevating, high-capacity (65 to 180 cubic yards per hour) batching plant that offers true over-the-road mobility. Erection is fast — 2½ hours or less. Erection is simple — no crane is required — self-contained hydraulic mechanism elevates plant. Erection is economical — average set-up cost approximately $200.00. Features two or three-belt aggregate conveying system and built-in, sealed, cement screw conveyor system. Available for ready mix, paving, or central mix operations.

WRITE FOR LITERATURE AND ADDITIONAL INFORMATION

HELTZEL

THE HELTZEL STEEL FORM & IRON COMPANY • WARREN, OHIO

CONCRETE PLANT CPMB MANUFACTURERS BUREAU

NOW WE'RE SATISFIED!

Despite the temptation to be first in the field, we determined not to offer a two-component Polymer type joint sealer to the industry until we were *completely satisfied with* BONDTITE's *field performance and ease of application.*

Now after critical laboratory testing and careful evaluation of actual performance in airfield and airport installations, we are certain that Servicised BONDTITE which is formulated around an entirely new Polymer, which fully complies with Federal Specification SS-S-00200a, and will outperform any other two component Polymer type joint sealer on the market. In addition, we have developed equipment for the application of BONDTITE which offers the contractor significant advantages in speed, efficiency and economy.

HERE ARE SPECIFIC INSTALLATION AND SERVICE ADVANTAGES OF BONDTITE:

√ **HIGH INITIAL FLUIDITY . . . SELF-LEVELING IN THE JOINT**—As BONDTITE leaves the applicator nozzle its viscosity is such that it approaches 100% wetting to produce a perfect bond with the full surface of the joint. This free-flowing characteristic makes BONDTITE self-leveling and prevents localized stacking. Upon cure, the material has no flow—even at elevated temperatures.

√ **COMPLETELY UNAFFECTED BY JET BLAST**—Jet blast and fuel spillage will not affect the bond, stability or cohesion of a cured BONDTITE joint seal.

√ **GREATER RESILIENCE**—Resilience of cured BONDTITE is such that foreign material temporarily pressed into it will be ejected, once application pressure is removed.

√ **SLOW RATE OF SET**—Though conforming with the specification, BONDTITE'S relatively slow rate of set provides greater ease of installation, eliminates waste of material due to delays in application.

√ **CAN BE INSTALLED AND WILL CURE PROPERLY AT LOWER TEMPERATURES**—Flow and cure characteristics imparted by BONDTITE'S new Polymer base permit installation and cure under lower ambient temperatures than any other material meeting the specification.

√ **FASTER INSTALLATION**—More lineal feet of joint can be sealed per hour because BONDTITE'S smooth, self-leveling flow into the joint permits a higher rate of application.

√ **50-50 COMPOSITION**—BONDTITE components are mixed 1 to 1 by volume, which simplifies handling in the field, prevents accidental imbalance of mix.

√ **FINALLY**, equipment for installing BONDTITE is designed to ensure a perfect blend of components—even on re-start. Built for fast, efficient field service, BONDTITE installation units eliminate many of the problems encountered with other equipment. Available under attractive Rental Plan.

SERVICISED ® QUALITY PRODUCTS

INTERESTED? Write for a copy of the Robert W. Hunt report on the BONDTITE 400 hour weatherometer test and complete specifications.

SERVICISED PRODUCTS CORPORATION
6051 W. 65th Street • Chicago 38, Illinois

. . . New Products

Hand-Held Squirt Welder Has Continuous Feed Coil

The Innershield Squirt Welder continuously feeds a tubular, self-shielding electrode through a welding gun that is manually supported and guided along the joint being welded.

According to the manufacturer, the 24-ounce welding gun combines the high deposition rates of an automatic welder with the flexibility and adaptability of a manual welder. Welding current from 350 to 600 amps is supplied by a dc motor-generator and is controlled by varying wire feed speed.

The portable welder control cabinet contains the current and arc controls as well as a fifty pound coil of innershield electrode. Fifteen feet of hollow welding cable carries the electrode and the welding current to the gun. Other controls on the cabinet are an electrode inch button, polarity switch, and volt and ammeters. LINCOLN ELECTRIC CO., CLEVELAND, OHIO.

Telephone Volume Adjusts To Suit Background Noise

A portable system designed for industrial telephone communications under any noise conditions uses transistorized amplifiers. A variety of earphone-microphone headsets is available.

Amplifiers are available for low to medium background noise and for medium to high background noise. Both are lightweight, according to the maker, and have self-contained batteries and controls.

Volume control permits the receiver to select a pleasing sound level.

For most applications, the distance between separate units is said to be unlimited, and it is possible for three or more units to work together in party-line fashion. COMMUNICATIONS SECTION, SEISMOGRAPH SERVICE CORP., P. O. BOX 1590, TULSA, OKLA.

Aluminum Alloy Holds Pump Weight to 40 Lb

Portable engine-driven centrifugal pumps in 1½ and 2-in. sizes have been added to the Rapidayton line. Made of a special aluminum alloy, they weigh about 40 lb each.

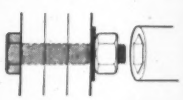
Both are equipped with four-cycle Briggs & Stratton engines—2 hp in the 1½ in. size, 3 hp in the 2-in. size.

Total head for both models exceeds 90 ft. Capacity of the 1½-in. pump is around 80 gpm and the 2-in. size is 120 gpm. Both are designed to handle water with a high percentage of solids. THE TAIT MANUFACTURING CO., 500 WEBSTER STREET, DAYTON, OHIO.

Structural engineers see new way to reduce cost of steelwork

An important change in the specification for structural joints permits a designer to work out economies in shop assembly and field erection costs right at his board.

No longer does the specification consider high strength bolts and rivets equal, except in friction-type joints. In the predominant bearing-type joints, the tensile/shear ratio is changed to take advantage of the new large-head short-thread bolts. Two of these do the job of three rivets; or replace three of the regular high strength bolts. Their short thread length excludes shear planes from passing through a threaded section. Thus, the full shank section is available to develop specified shear strength.



Moreover, only *one* hardened washer is used . . . under head or nut, whichever is torqued in tightening. Obviously, by eliminating one-third the holes, one-third the bolts or rivets, and one-half the washers, shop fabricators can save up to 40% on connections. Field erectors can realize savings similar to these.

But these savings won't be completely realized, and reflected in lower costs, until *the designer puts this new fastening improvement to work.*

So, if you're a structural engineer, plan now on the economies in the new RB&W High Strength Bolt. And if you're a fabricator or field erector, count on a full size range of these bolts from RB&W . . . all with traditional RB&W quality and certified conformance to ASTM A325 specification. For more data, write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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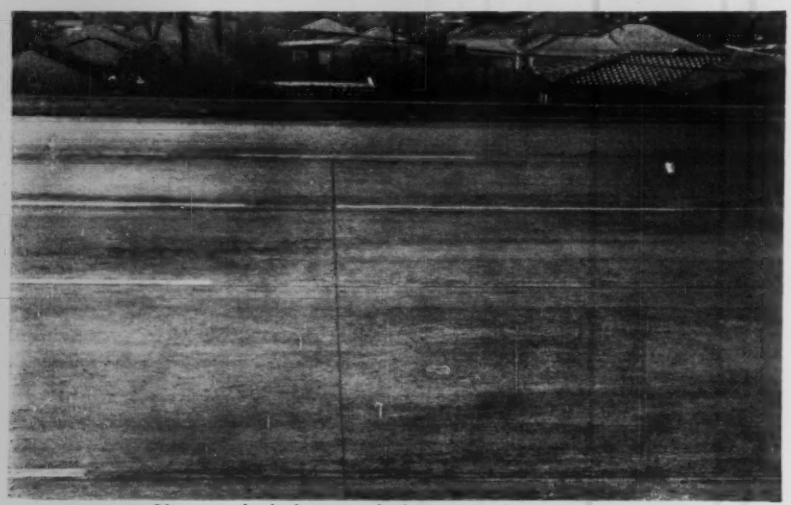
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Sales office and warehouse at: San Francisco, Calif. Sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas. Sales agents at: Cleveland; Milwaukee; New Orleans; Denver; Fargo.

LARGEST INDEPENDENT PRODUCER OF HIGH STRENGTH BOLTS FOR CONSTRUCTION

DIAMOND BLADE SAWING is cutting highway construction and maintenance costs!



Unretouched photograph shows sawed joint that has been in use for one year.

Diamond Blade Sawing cuts precise, uniform highway and runway joints by high-speed, semi-automatic operation. It reduces time and labor costs during joint construction . . . eliminates follow-up finishing work and is conducted without delay or interference to other paving operations.

The high precision quality of the joints produced, unmatched by any other method, aids in decreasing annual maintenance costs by as much as 50%. Reason? Only Diamond Blade Sawing can maintain maximum concrete strength and homogeneity in the joint areas and thus minimize the prime causes of spalling, cracking and chipping.

Modern Diamond Blade Sawing results are a matter of record now, based on performance in projects throughout the country. Facts and figures are readily available. We strongly recommend thorough investigation. ★ ★ ★ ★ ★ ★ ★ ★ ★

For detailed information and field-use reports from state highway officials and contractors, write to Engelhard Hanovia, Inc., for Report #101.

Engelhard Hanovia, Inc. is a leading supplier of diamond abrasive to manufacturers of diamond blade sawing equipment.

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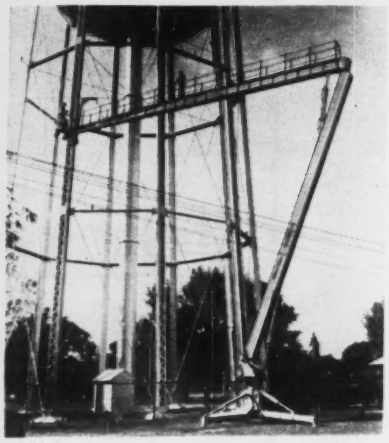
. . . New Products

Boom Extends 104 Ft . . .



. . . Bends into Scaffold

The Ottawa Strato-Tower (Series D, Model 104) may set a record as the world's tallest aerial platform tower that can travel legally on U. S. highways.

Its boom can be extended to 104 ft, yet it folds to a traveling clearance of only 11½ ft.

The 51-ft catwalk on the upper boom can be used as a scaffold 15 to 55 ft above ground.

The working end of the 104-ft boom is a 24x28-in. folding steel basket. It will carry 500 lb. Standard equipment includes a winch crane (with 500-lb lift capacity), welding cables and 110/220-volt lines for power tools, and dual ground and basket controls for lifting and positioning the basket.

Boom stability is insured by a 6:1 structural safety margin and five outriggers, three at the boom base and two on the trailer. Young Spring and Wire Corp., Equipment Division, Bowling Green, Ohio.

Central Pennsylvania Quarry, Stripping and Construction Company is using Joy 450-DR Drill, RP-600 Compressor teams to blast an estimated 1¾ million cubic yards of rock on a 6½ mile stretch of Interstate 40 near Nashville, Tennessee.

Joy Drill-Compressor Teams "go anywhere—drill anything" on Central Penn's Interstate 40 rock job

Central Penn operators like the way the Joy TDM Carrier with 450-DR Drill will "go anywhere—drill anything." The TDM's scramble over extremely rough terrain and steep grades while pulling the 600 cfm Joy compressors. The rugged U-Bar TDM's provide drilling stability under all conditions up to 45° slopes. Drilling in broken rock, the 450-DR's have averaged 320 feet of 3½" hole per shift for a year—including all moving and set up time.

Joy's 450-DR Drills have proved their ability to outdrill anything in all types of rock. The unique rotation assist on the 450-DR provides the extra boost to keep going under any conditions. An independent air motor powers the rotation assist and also provides reverse rotation for hammer-free steel changes. For complete information on how the Joy TDM Mounted 450-DR Drill and RP-600 Compressor team can cut your drilling costs, write for Bulletin 3183-24.

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***PVC is Plastic**

New Product Briefs

• **Street cleaner**—Vac-All model E-5, street-highway vacuum cleaner, picks up debris, stones, sand, bottles, etc., and doubles as a catch-basin cleaner. Holds 16-cu-yd. Intake hose can feed into either side or the rear of the truck. A 103-hp, 6-cyl industrial engine powers the high-pressure blower to maintain vacuum. CENTRAL ENGINEERING CO., INC., 4429 WEST STATE ST., MILWAUKEE, WIS.

• **Belt conveyor**—Model 130 portable, handles gravel, sand, dirt, rock, stone, coal, etc. For use with vibrating screens, traps, feeders, hoppers to form complete portable screening plant. Belt widths: 18, 24, 30, 36 and 42 in. Standard lengths: 40, 50, 60 and 70 ft. ATLAS CONVEYOR CO., P. O. BOX 59, CLINTONVILLE, WIS.

• **Spray-on insulation**—For thermal insulation of steam and gas turbines. Sprayed Limpet Asbestos can be built up to a thickness of several inches. Sprays directly onto surface of castings that form turbine housing. KEASBEY & MATTISON, AMBLER, PA.

• **Tile tester**—Model PT-14 measures strength of clay and concrete drain and sewer tile under loads up to 14,000 lb. Tests pipe with ID up to 24 in. and lengths to 48 in. Can be used in accordance with ASTM specifications. FORNEY'S INC., TESTER DIV., P. O. BOX 310, NEW CASTLE, PA.

• **Sieve shaker**—Testshaker for sizing aggregate has recessed base to accommodate 8-in. and 12-in. dia sieves. 8-in sieves in full height stack eight high, in half height stack 16 high. 12-in. sieves stack six high. Shaking in three directions by manual or electrical power. TESTLAB CORP., 3398 MILWAUKEE AVE., CHICAGO 41, ILL.

• **Trencher**—Ware 800, 9/16-cu-yd trencher for use on Oliver "880" industrial wheel tractor. Hydraulically controlled. Digging reach, max 22 ft; 180 deg swing; breakaway capacity, 10,400 lb. Multi-speed control of boom and dipperstick. OLIVER CORP., 1420 MAYFLOWER ST., HARRISBURG, PA.

• **Suction hose**—Water suction hose called Rebound springs back to shape even when run over by a truck. Available in 50 ft lengths in diameters from 1½ to 3 in. Hose shape is maintained by specially treated rope helix embedded in heavy rubber between two piles of reinforcing fabric. GOODYEAR TIRE & RUBBER CO., AKRON 16, OHIO.

• **Leak-stopper**—Flextite. Liquid chemical additive that regulates setting of cement to stop direct leaks. Also used as water-resistant plaster coat. FLEXROCK CO., 3649 FILBERT ST., PHILADELPHIA 1, PA.

• **Folding partition**—Modernfold Soundmaster 240. Steel-lined with four inner sealing strips. 41.8 decibels sound reduction. Available in a variety of colors and fabrics in sections up to 25 ft high and 60 ft wide. NEW CASTLE PRODUCTS, INC., BOX 353, NEW CASTLE, IND.

• **Floor joint filler**—Flexjoint. Two-component resin system in pouring and caulking grades. Bonds to concrete and brick surfaces over a wide temperature range. Sets in three hours; cures in 24. CORROSION ENGINEERING PRODUCTS DEPT., PENNSALT CHEMICALS CORP., NATRONA, PA.

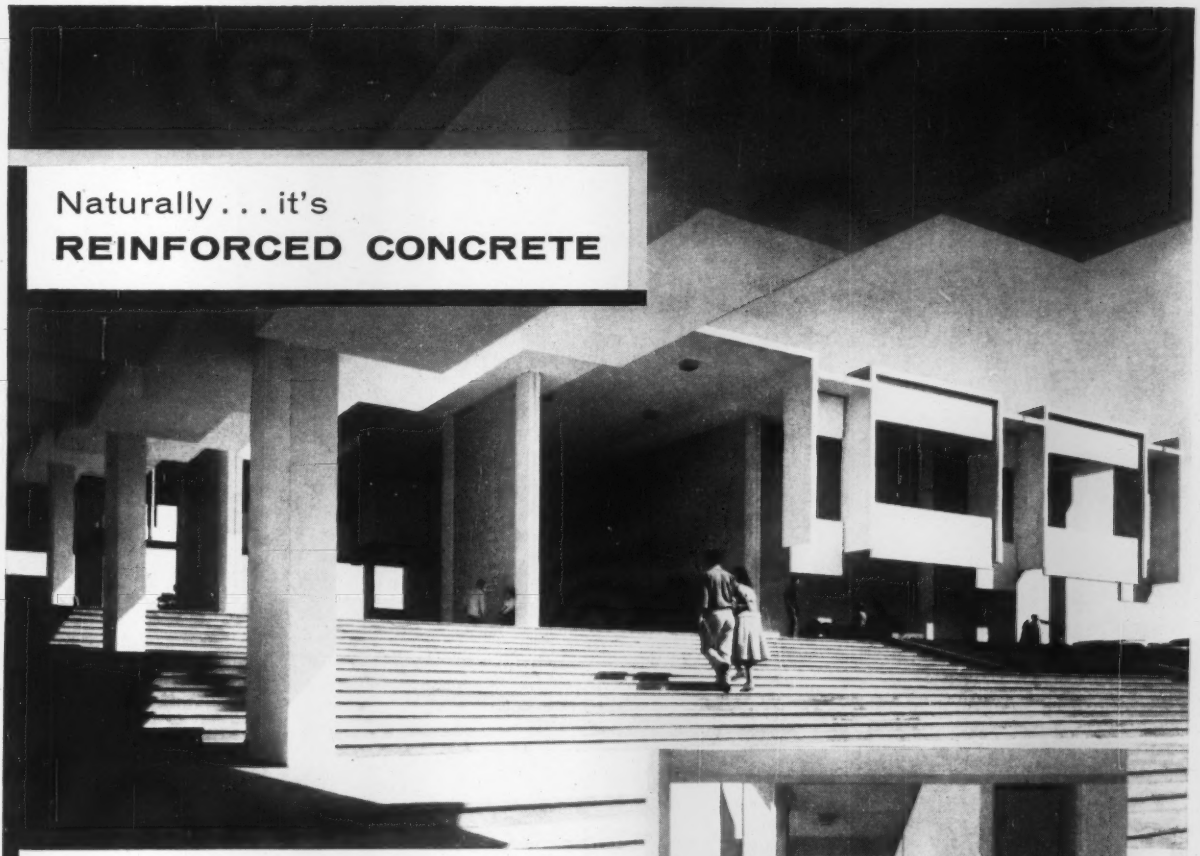
• **Air handling unit**—Sun-Flo Model AH-2. Horizontal make-up air unit with dual-fan. Capacities of nine sizes: 20,000 to 60,000 cfm of air, and 1.8 million to 6 million btu per hr. METALS ENGINEERING AND MANUFACTURING CO., INC., 8824 LYNDON, DETROIT 38, MICH.

• **Bonding agent**—Woodstix. Adhesive for parquet wood blocks or laminated blocks. Bonds to any floor surface, including concrete. Applied easily with a serrated trowel. ADHESIVE PRODUCTS CORP., 1660 BOONE AVE., NEW YORK 60, N. Y.

• **Foam insulation**—Lockfoam H-602. Pour-in-place urethane foam. Provides dimensional stability at sub-zero temperatures to eliminate shrinkage. Low density: 2 lb per cu. ft. PLASTICS DIVISION, NOPCO CHEMICAL CO., NORTH ARLINGTON, N. J.

• **Ceiling tile**—Tiara Series. Available in non-perforated and punched surfaces with three design patterns. Three different heat-set colors. THE FLINTKOTE CO., 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

• **Submersible pump**—Model S has plastic exterior parts to increase resistance to corrosion and abrasion, improve fatigue endurance and reduce weight. The pump has a maximum capacity of about 30 gpm and is effective to depths of 600 ft. It is available in 18 models from ¼ hp to 5 hp and from 7 to 31. AERMOTOR, INC., 2500 WEST ROOSEVELT ROAD, CHICAGO 8, ILL.



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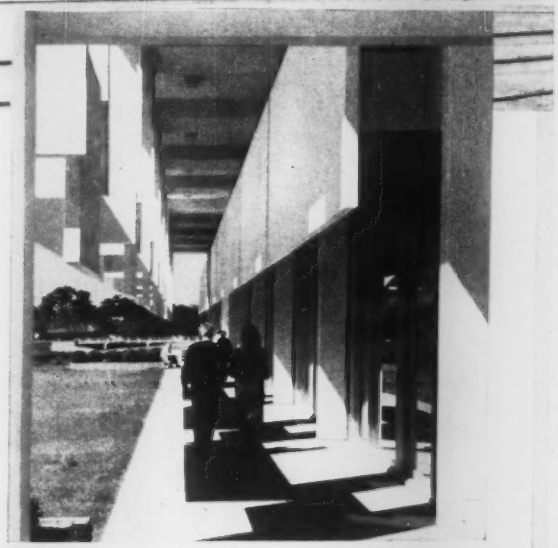

Sarasota Senior High School, Sarasota, Florida
Architect: Paul Rudolph, New Haven, Connecticut
Structural Engineer: Sidney Barker, Tampa, Florida
Contractor: Coe Construction Co., Charlotte, N. C.
Photographs by Ezra Stoller, Rye, New York

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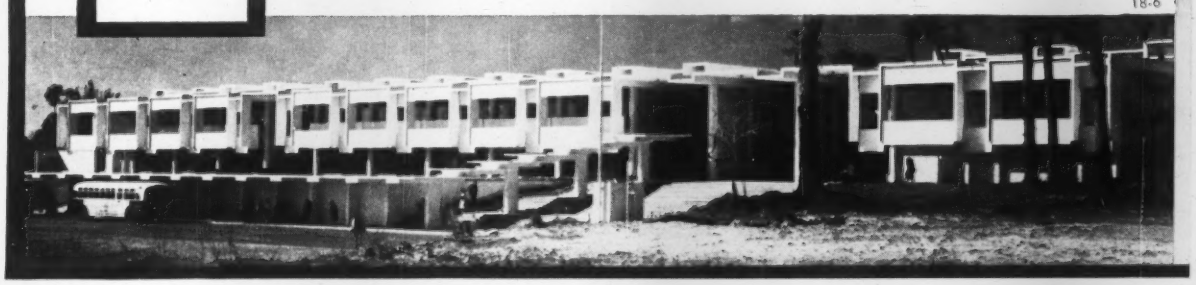

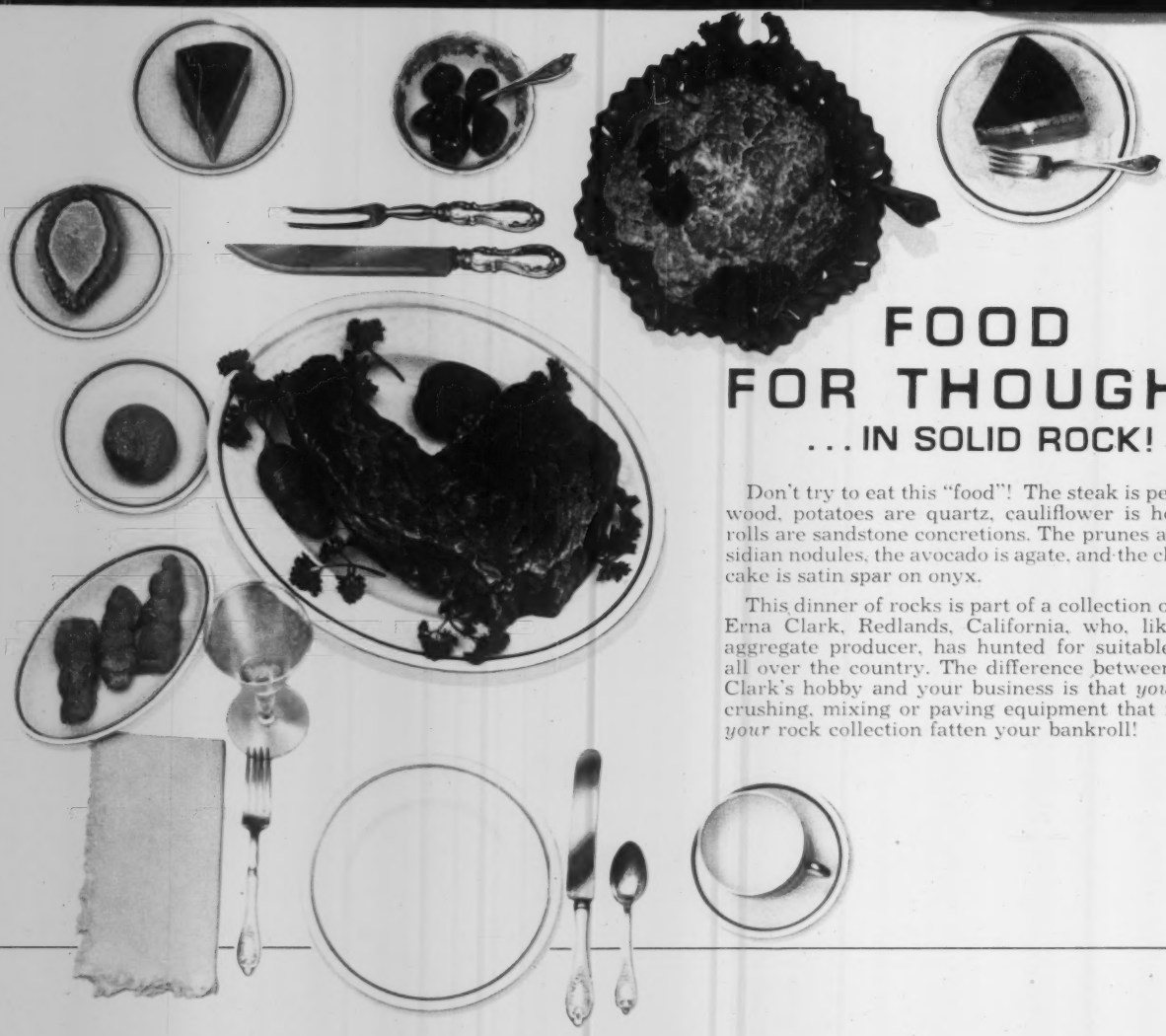

FOOD FOR THOUGHT

. . . IN SOLID ROCK!

Don't try to eat this "food"! The steak is petrified wood, potatoes are quartz, cauliflower is howlite, rolls are sandstone concretions. The prunes are obsidian nodules, the avocado is agate, and the cheesecake is satin spar on onyx.

This dinner of rocks is part of a collection of Mrs. Erna Clark, Redlands, California, who, like any aggregate producer, has hunted for suitable rock all over the country. The difference between Mrs. Clark's hobby and your business is that *you* need crushing, mixing or paving equipment that makes *your* rock collection fatten your bankroll!

Think about your equipment . . . your competition . . .

YOUR PROFIT'S AT STEAK!

Whether you spell it steak or stake, profit is the meat of your business. Getting on the gravy train depends on equipment that can handle the job economically — on what your competition is doing — and on YOU.

Years ago a customer in Texas wrote, "I wish you'd quit selling Commanders to contractors in my neighborhood. The only real competition I have around here is other Cedarapids plants."

Chew that over awhile. Then digest this thought . . .

Throughout the years, Cedarapids owners have learned by experience that Cedarapids equipment out-produces and out-economizes any other. Know why? Because Cedarapids has always been first in developing and introducing equipment that meets increasingly difficult requirements with increased production and no beefs about maintenance.

When you own Cedarapids equipment you are three to five years ahead of your competition in low-cost production. And you are the one who keeps eating high on the hog with the greatest profit.

THAT'S FOOD FOR THOUGHT!

Cedarapids

Built by IOWA

Portable Aggregate Plants and tandem crusher plant design were born at Cedarapids, and put big-capacity crushing on wheels for mobility to move with the job and bring profitable production to the job site. With this lead in the race to give contractors ever better, more productive equipment, Iowa Manufacturing Co. researched and engineered, developed and improved crushing plant design to its present unequaled Cedarapids standard of efficiency and economy.

Cedarapids Twin Jaw Crushers have been giving contractors 40% to 100% greater primary crushing capacity for the past seventeen years . . . years of extra profits for Twin Jaw owners! This time-proved unit is stepping up output in Super Commander Plants (above) and other Cedarapids models. Now, the two-movable-jaw principle is no longer a Cedarapids exclusive. Other equipment manufacturers are following our lead, while Cedarapids engineers are working on revolutionary products for the future.

Cedarapids Horizontal Vibrating Screens have been first choice in the industry for 25 years, because horizontal screen design gives 12½% more effective screening area, 30% higher capacity, and much greater accuracy in grading specification sizes. After profit-conscious contractors began to expect the advantages of better screen performance in portable as well as stationary plants, which only horizontal screens could give, other equipment manufacturers again followed our lead.

Bituminous Mixing Plant all-automatic design with true weight proportioning is the result of experience gained since 1946 when Cedarapids first equipped batch-type plants with semi-automatic controls for faster, better bituminous mixing. Cedarapids was also first to cut between-job delays with a 100% portable and self-erecting batch-type plant. Though other manufacturers have followed, Cedarapids still leads in the many other profit-proved batching, mixing and drying advantages that assure extra batches per hour for extra earnings per year.

Cedarapids Bituminous Pavers brought another profit-first to paving contractors. The Cedarapids Paver is the only such machine that lays inspector-accepted mat at 102 fpm; the only paver with a high frequency vibrating screed; the only paver so automatic it almost operates itself. And maintenance costs are exceptionally low. When you own a Cedarapids Paver, your only competiton is another Cedarapids owner . . . and you'll have this profitable advantage until Cedarapids patents run out and other manufacturers can follow our lead.

INS 19

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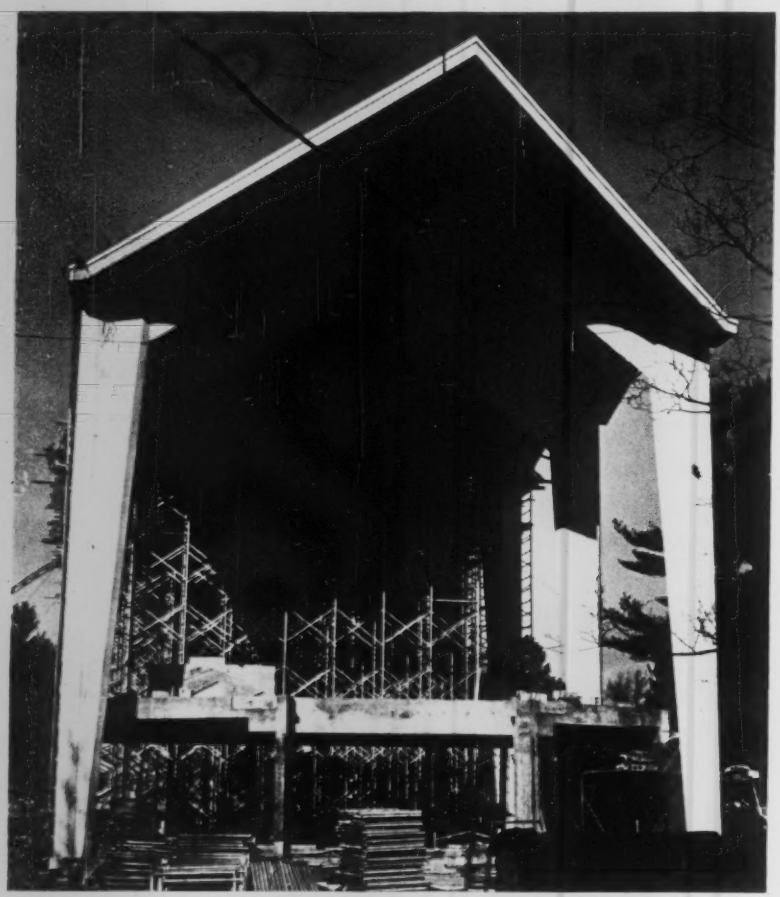
IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

Scaffolding and Shoring Methods... by PSCo

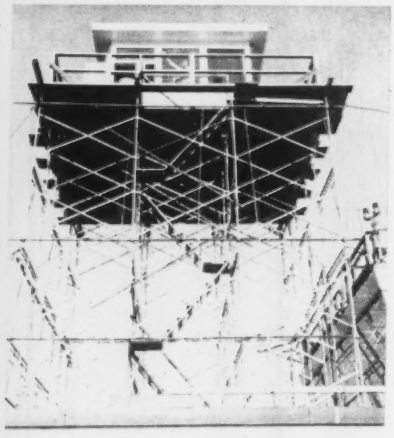


Safe, sure support for complicated roof . . .

20K frames (each capable of carrying 10,000 lbs. per leg) of "Trouble Saver"® Sectional Steel Shoring are used here to support this complicated 1 -to 5 -thick concrete roof system of sloping planes and hyperbolic paraboloids. Shoring is quickly erected in free standing, safe towers to meet varying heights. 5-bay, 52' x 167' . . St. Mark's Episcopal Church, New Caanan, Conn., is being constructed by Frank Mercedes & Son, general contractor.

Double decker . . .

Upper level is standard 5 -wide "Gold Medal"® Safety Scaffold Machines used for installing face brick. Lower level is special 5 -wide platform hung 6 6 below by steel cable from upper scaffold, used for installing shadow wall. Y.M.C.A. building, New Orleans, Gervais F. Favrot, contractor.



Temporary tower . . .

26 -high "Trouble Saver" Scaffolding tower with interior steel stairways is erected atop the 126 -high Terminal Building, Logan Airport, Boston, for use by Federal Aviation Agency. 6'6" end frames are tied together with standard diagonal braces and extra "TubeLox"® tubular members. Entire unit is guyed to inserts welded in steel. Note interior "Trouble Saver" Scaffolding stairways for access.

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In Portland, Ore., Fred Fowler advises City Hall on . . .

What to Do Before the Freeway Comes

By Paul Hauser

Some cities accept freeway construction within their boundaries as something akin to an act of God, such as a hurricane, a rainbow, a flood or a mild summer. They see the consequences of freeways—elimination of slums or division of a desirable neighborhood, creation of a park or a surge of unmanageable traffic—as inevitable and immutable.

Some cities react this way, but not Portland, Ore., which has knowledgeable, aggressive, 71-year-old Fred Fowler to defend its interests.

A veteran of 50 years of service with the City of Portland, Mr. Fowler operates like a combination of diplomat and general. His battles and his alliances are all aimed at improving Portland's traffic.

Since 1958, when the Portland City Council created his position of highway coordinating engineer, he has been working exclusively to make the Oregon State Highway Commission urban freeways merge as efficiently as possible with the city street system.

"It's almost a necessity to have someone well versed in city traffic problems to work with the state," he says. "It's not possible that they can anticipate all the problems the city has. Someone has to spend a lot of time and a lot of study to be sure that what they work out is the best possible solution."

Fred Fowler isn't downgrading the work or the abilities of the Oregon Highway Department. Portland is the only truly metropolitan area in the state and the traffic problems bred of its short blocks and narrow streets are not common in the highway department's planning.

"It's a big problem—fitting a freeway system into an existing street system," the veteran traffic engineer says. "And if you wait until they drop the plans on your desk and ask for approval, there's never enough time. In order to get a satisfactory plan, you've got to work with them from the beginning."

For instance, the state's first plan for Portland's Eastbank Freeway, on which construction started recently, provided only a 5-ft shoulder sloping off to the river. Mr. Fowler pushed for a 45-ft strip that could be landscaped as a parkway with a pedestrian walkway along the river. Federal funds were unavailable for such a development, the state finally agreed to pay 75% of the extra cost and the city paid the balance.

Although their relationship with Mr. Fowler has been rich in argument, state highway engineers are quick to agree that the Portland system of working closely with their planning through Mr. Fowler has proved beneficial. It has also smoothed their public relations task in Portland. Mr. Fowler's weight on the side of the state made it much easier to gain public acceptance for the state's choice of route for the Stadium Freeway over determined opposition from big downtown property owners (ENR June 6, 1960, p. 24). In another instance, Mr. Fowler's persuasive case for a low level route to carry north-south Interstate traffic along the east bank of the Willamette River rather than on an elevated structure several blocks eastward brought about agreement on the east bank route prior to a public hearing. The hearing became an unusual expression of unanimity and good will.

Not one of those who thinks of freeways as a bad dream that may vanish and no longer bother cities, Mr. Fowler declares they are more necessary in a metropolitan area than anywhere else.

"Traffic originates in cities and traffic terminates in cities," he says. "To serve a metropolitan area you have to provide freeway access into the heart of the city. Smaller places you can by-pass, but you can't by-pass a big city. That's where the people want to go. Certainly the freeway through the city costs more, but

(*Continued on p. 128*)

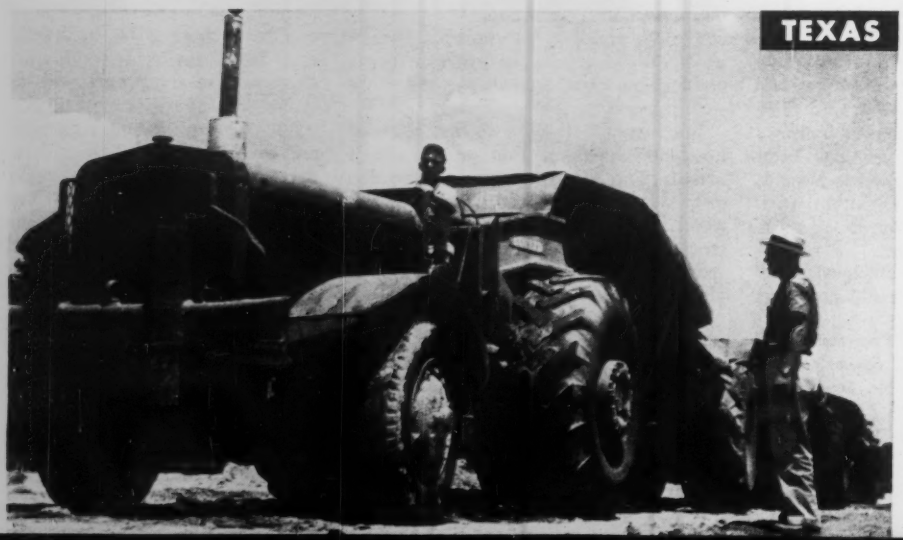
***Paul Hauser**, ENR's Portland correspondent, has been reporting on Fred Fowler's activities since the days when Mr. Fowler was Portland's traffic engineer.*

WYOMING

Highways make headway with B.F.Goodrich

FOUR-LANE WHEATLAND-GLENDO FREEWAY takes shape as fleet of Woodward Construction Co. scrapers o B.F.Goodrich Rock Service tires move 960,000 cubic yards of rock and dirt. Note the BFG Servicemobile. It's fully equippe with the latest power tools to handle tires—and trained BFG tire men are always on call to make fast, expert tire repairs. Servic like this can make the difference between profit and loss on a job.

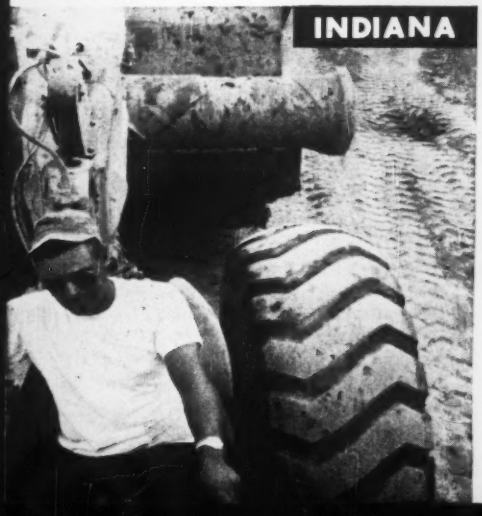
TEXAS



BUILDING U.S. HIGHWAY 5 calls for a fleet of earthmovers t wind over sandy soil hauling 30-to loads of fill dirt. Because flotatio and traction are "musts," William Bros. Construction Co. choose B.F.Goodrich Super Traction tire Note the wide, flat tread—the shar deep cleats. The BFG Flex-Rit Nylon cord construction has twic the strength of ordinary material resists heat blowouts and flex break It's not unusual for BFG tires t be retreaded again and again.

DOLLAR-SAVING B.F.GOODRICH TIRES AND SERVICE SPEED HIGHWAY CONSTRUCTION ALL AROUND THE COUNTRY

SCRAPER HAULS 30 TONS OF DIRT, works 60 hours a week to speed construction of Interstate Highways 65 and 465. BFG Rock Service tires give 4,000 hours' service, Contracting-Material Co. reports, can still be retreaded. One reason: B.F.Goodrich Flex-Rite Nylon cord construction.



THE NEXT TIME your bid gets the nod, take a tip from highway contractors in every corner of the country and have a talk with your B.F.Goodrich dealer. He can help you so many ways. With tires for every vehicle on the road (or in the rough) built with such BFG specialties as Flex-Rite Nylon cord construction, Cut Protected and Heat Resistant compounds. With BFG conveyor belting, V-belts, hose, protective clothing. With BFG steel toe, steel insole safety boots. With on-the-job service that keeps you on the go. With friendly, knowledgeable advice that helps keep costs low. No matter what the job or where, you'll make headway easier and faster with B.F.Goodrich. Your nearby dealer is listed under Tires in the Yellow Pages.

The B.F.Goodrich Company, Akron 18, Ohio.

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IT'S MADE TO LAST A LIFETIME
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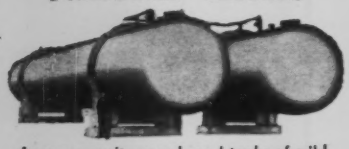
POSEY

TANKS AND PRESSURE VESSELS



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the cost per vehicle mile, because of the heavy volume of traffic on the urban freeways, is probably less than on rural freeways."

A grave problem for Portland and many other cities building freeway networks is, as Mr. Fowler sees it, lack of funds to improve the major street system to take the traffic that freeways will bring into it.

"Our city streets are below standard for the traffic on them at present, let alone what they will have to carry in the future," he says. "The public will be more aware of what the problem is when the freeways are completed, but by then we'll be 15 years behind where we are now."

Like most large cities, Portland suffers from the "city slicker" suspicions of a legislature dominated by rural representatives. Oregon cities divide 10% of the state's gasoline tax receipts for street purposes. But a few years ago the legislature cut Portland's share to 65% of its full portion as determined by population.

From 1937 to 1958, when Mr. Fowler was Portland's traffic engineer, his singleness of purpose won him a reputation for abrasiveness. Sticking to engineering facts and shunning dramatics or politics, he has always been a tough man to dislodge from a course. In planning and putting into effect downtown traffic control measures, he stood off powerful merchants—a group that has more than its share of amateur traffic engineers.

Mr. Fowler's most noted achievement as traffic engineer is Portland's one-way grid system. When it went into operation in 1950 it covered 23 miles of streets, the biggest such installation in the country. Portland now has close to 50 miles of one-way streets. The gain in traffic volume and accident reduction has been notable.

"I filed that report in 1946 and it took four years to get it in," Mr. Fowler recalls now. But since the delay largely involved eliminating streetcars and replacing them with buses, it isn't generally considered an overlong wait.

As an engineer whose half-century professional career has paralleled and been intimately connected with the bourgeoning of the automobile, Mr. Fowler doesn't believe that a resurgence of mass transit will ease traffic and highway problems.

"You've got to maintain a system of mass transit for the "must" riders, but I think the idea that you're going to coax people back to mass transit by improvements in service is just wishful thinking," he says. "Improvements do attract some, but never enough to pay the extra cost."

IF YOU WAIT until they drop the plans on your desk, there's never enough time.

In 1912, when Mr. Fowler hung his fresh diploma from the University of Oregon School of Engineering over a draftsman's table in Portland's City Hall, nearly everybody travelled by street car. "There were few passenger automobiles and hardly any trucks—just horse-drawn vehicles," he recalls.

Named bridge and highway engineer for the city in 1920, Mr. Fowler continued in that role until he became traffic engineer in 1937.

From 1926 to 1928 he supervised what was at the time Portland's largest construction project—a mile-long Harbor Wall on the west side of the Willamette River at the foot of the city's business district. It cost $2.75 million at 1927 prices.

The project, known more precisely as Front Street Intercepting Sewer Drainage System, was designed to keep Willamette River flood from backing sewage into the basements of uptown office buildings and department stores.

It did its primary job well. In the great flood of 1948, which wiped out the war community of Vanport, water lapped at the top of the 65-ft-high wall, but didn't penetrate it. As a dividend more noted by the public, the Harbor Wall made possible a river vista from the business district and right of way for Portland's Harbor Drive. A grassy strip and a wide walkway separate the wall from the roadway, providing an area for strollers.

The esthetic touches that Fred Fowler accomplishes have often won the praises of the City Planning Commission—which, as in other cities, doesn't always see eye to eye with the freeway planners.

Mr. Fowler believes cooperation between city planners and highway planners is increasing as they begin to

(Continued on p. 130)

With his clamshell busy on another job, this contractor assigned a newly-acquired rubber-tired Tractor Shovel to "fill in" on a basement excavation and discovered . . .

Michigan cuts digging costs 50%

"Experimenting with a new machine on a routine job can sometimes bring amazing results," reports Darrell Bilton, president of Bilton & Bilton Co, earth-moving firm in St. Joseph, Michigan. "In one particular instance, such experimentation helped us *reduce* basement excavation costs *by one-half*.

"About a year ago we bid a basement job as usual . . . on the basis of what our ½ yd clamshell-rigged crane could do," he continues. "However, when it came time to start the project, the clamshell was busy on another assignment. So, to 'fill in' until the clam could be freed, we drove our 2¼ yd Model 175A Michigan Tractor Shovel to the site.

"There never was any need to bring in the clamshell. The Michigan dug and truck-loaded 525 bank yards of heavy (3200 lb) blue clay in 6½ hours . . . *completing the excavation at such a low cost to us that we refunded the builder 28% of the original bid price.*"

Proves itself on 22 basements . . . other jobs

Even with this favorable experience, Bilton & Bilton Co was reluctant for a time to bid basements on the basis of what the Michigan could do. After all, they'd acquired the unit primarily to truck-load stockpiled excavation, and sand and gravel on larger construction jobs. There were a number of questions to be answered before fully adopting the mobile, rubber-tired unit for this work:

ONE—Could the Michigan hold up under high-speed, hard digging?

ANSWER—Over a year later, having dug 22 basements and completed numerous other excavation jobs, the Model 175A is still 100% available . . . requires nothing more than routine preventive maintenance.

TWO—Could the rubber-tired unit work under unfavorable conditions, for example, rainsoaked clay?

ANSWER—The Michigan dug most of its basements under just such conditions this past spring, reported to be one of the wettest in St. Joseph history.

THREE—Could a Tractor Shovel this size (2¼ yds) be profitably assigned to basement excavation when larger construction assignments were competing for its time?

ANSWER—Because of its mobility and speed (28 mph) in traveling between locations, Bilton & Bilton found the Michigan could work more jobs per day . . . and save 70% of the cost of moving either a clamshell or crawler loader.

"We feel the Michigan has more than proved itself on all types of excavations . . . *in both hard clay and sandy materials*," Mr. Bilton emphasizes. "Our cost records show it digs basements so economically *we can't afford to use any other type of unit!*"

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Grating Division, Gary, Indiana

understand better each others viewpoints through working together.

"We take the plans of the Planning Commission and work with the state and federal people to get everything we can out of that. We can't get everything the city planners want. If we did we'd spend half again what is allowable," says Mr. Fowler.

"You can't hope to get everything you want. By compromise you can get part of it. When you're through, you'll have something to be proud of."

Never a 9-to-5 civil servant, Fred Fowler for years has kept a drafting board at home and often works in the evenings on some problem of traffic movement. His only hobby appears to be taking color photographs of his grandchildren. He does not drink, smoke, golf, fish, hunt or play poker. He is, however, somewhat addicted to matching pennies.

January 1, 1962 will mark 50 years of engineering service to the City of Portland for Fred Fowler. Actually, he has not been directly on the city payroll since last year. By state law covering retirement of public employees he officially retired when he turned 70. But the City of Portland took unique action in his case. It hired a firm of consulting engineers to do the work of highway coordinating he had been doing, knowing that Fred Fowler would be their man in the City Hall.

He was naturally pleased to continue the job he had first seen the need for.

"I know I'd be very unhappy seeing some of these things without getting my finger in the pie," he says.

Retired Navy Engineer Joins Providence Firm

Henry J. Fitzpatrick, Captain, CEC, USN, (Ret.) has joined the engineering firm of Charles A. Maguire & Associates, Providence, R. I. Captain Fitzpatrick, who graduated in civil engineering from Tufts College in 1928, retired from the Navy's Civil Engineer Corps April 1, after 21 years of government service.

In his last assignment, as public works officer at the Portsmouth (N. H.) Naval Shipyard, he was also officer in charge of construction of facilities there for the building and overhaul of Polaris submarines.

Among his earlier tours of duty were included such positions as chief of the engineering division of the Joint Construction Agency in Paris in 1953, assistant to the director of construction of the Joint U. S. Military Assistance Group in Madrid, 1954-56, and deputy director, Atlantic Division, Bureau of Yards and Docks, New York, 1956-58.

NSPE Elects Wilson Prexy; Picks Six Vice Presidents

Murray A. Wilson, a consulting engineer of Salina, Kan., has been elected president of the National Society of Professional Engineers. He is a semi-retired consultant to Wilson & Co., which he founded in 1941.

He has served as chairman of a number of committees for the Society, and is a past chairman of the NSPE Board of ethical review. The experience he has gained on that board will be brought to bear in a committee he has set up to study engineering ethics in the light of modern conditions. Existing ethical codes, he says, apply primarily to consulting engineers, his study aims at finding wider application for the codes.

Mr. Wilson is a member of the ECPD engineering college accrediting committee for Region V, of the Kan. State College Research Foundation and of the Kansas governor's advisory committee on flood control.

Six area vice presidents elected by the NSPE are: W. E. Christian, northeastern area; H. F. Pierce, southeastern area; W. W. Wegner, north central area; C. R. Hanes, central area; T. T. Mann southwestern area; J. H. Stufflebean, western area.

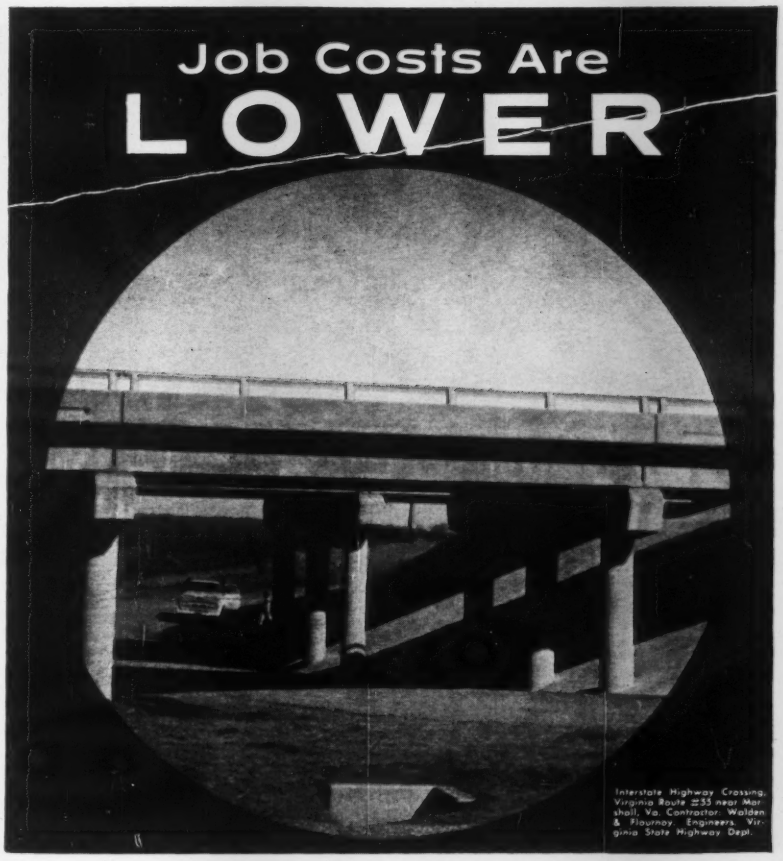
Harry Immerman Elected Moles President for '61

Harry T. Immerman, vice president and chief engineer of Spencer, White & Prentis, Inc., has been elected president of the Moles, an association of heavy construction men who specialize in underground work. He has been the top executive of the Moles since the death last September of Chester W. Cambell, the 1960 president.

Earlier this year, Mr. Immerman won the 1961 Moles Member Award for his work in devising all-steel subway decking.

A native of New York City, he graduated from Columbia University in 1913. A year later he was chief engineer for the contractor building Lewisohn Stadium for City College of New York. By 1915 he was placed in charge of underpinning for subway construction being done in the Times Square area. Mr. Immerman began his long association with Spencer, White & Prentis in 1923.

Other officers elected were Eugene J. Rau of J. Rich Steers, Inc., first vice president; Howard G. Dixon of Johnson, Drake & Piper, Inc., second vice president; Joseph B. Diamond, treasurer; and Eugene F. Moran, Jr., of Moran Towing Corp., secretary.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LOWER
Interstate Highway Crossing, Virginia Route #35 near Marshall, Va. Contractor: Walden & Flournoy Engineers, Virginia State Highway Dept.

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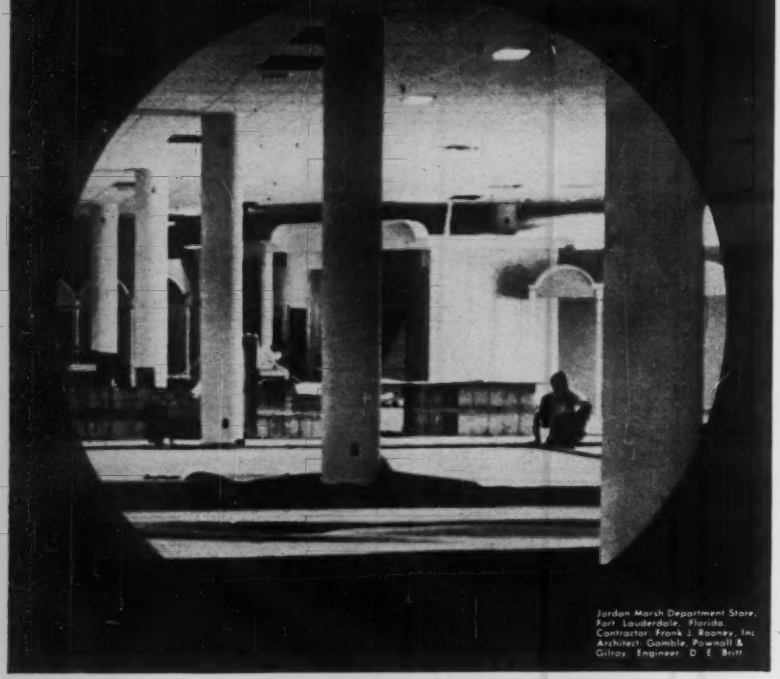

Jordan Marsh Department Store, Fort Lauderdale, Florida. Contractor: Frank J. Rooney, Inc. Architect: Gamble, Pownall & Gilroy. Engineer: D. E. Britt

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With FIVE different types available, there's a SONOTUBE Fibre Form to meet virtually any job requirement efficiently and economically. *Only Sonoco* offers this economy of choice:

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Order SONOTUBE Fibre Forms in sizes 6" to 48" I.D., standard 18' lengths or as required.

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Albrecht Off to Pakistan For Transportation Study

Major General F. M. Albrecht, who retired from the Army Corps of Engineers last year, has left for East Pakistan as a consultant with Transportation Consultants, Inc., a Washington firm. From Dacca, East Pakistan, he will make a six-month survey of existing water-borne transportation in the area.

His survey, correlated with other studies being made of other forms of transportation, will determine desirable, economically justified, and integrated long-range improvements that will assist the economic development of Pakistan.

For three years before his retirement, General Albrecht was commander of the Corps' South Atlantic Division and a member of the Board of Engineers for Rivers and Harbors. Earlier, he was a transportation planner in other parts of the U. S. and Europe.

Survey-Mapping Congress Names President for '61

Brother B. Austin Barry, associate professor of civil engineering at Manhattan College, was elected president of the 6,500-member American Congress on Surveying and Mapping at its 21st annual meeting in Washington, D. C. He succeeds Rear Admiral Arnold Karo, director of the U. S. Coast and Geodetic Survey.

Brother Barry, a leader in efforts to re-establish the importance of surveying and mapping, for the past five years has headed an ASCE task committee on the status of surveying and mapping in the U. S.

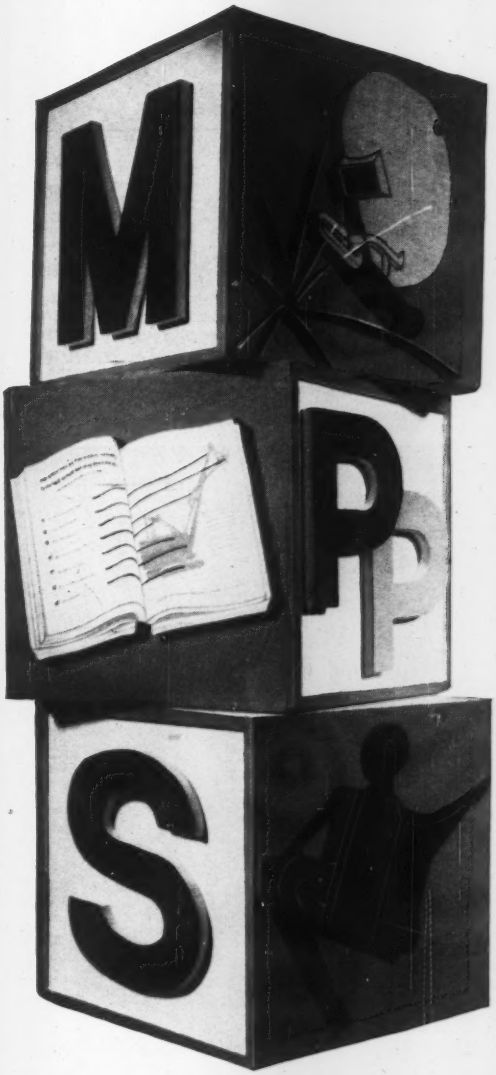
Brother Barry served on the Congress' board of directors from 1956 to 1958 and was national vice president last year.

Briefs . . .

Public Works

Martin W. Oettershagen has been sworn in as administrator of the St. Lawrence Seaway Development Corp. Deputy administrator since 1954, he has been acting chief executive since the death of Administrator **Lewis G. Castle** last June. New deputy administrator is **Joseph McCan**, former executive vice president of the Hall Lamp Co. of Detroit.

William L. Hall, with the Portland, Ore., regional office of the Bureau of Public Roads since 1946, has been promoted to planning and research engineer to take the place of **John R. Sargent** who retired last month.



S stands for service . . . service to you as a customer. Marion service is built from a number of solid blocks. It starts with a product that can take sustained rugged performance. It includes good maintenance manuals for your operators and machines. It includes availability of skilled service men from distributors and Marion field offices. And it's backed up by home office people and policy that recognizes the importance of service to you. As in our logo, all-around Marion service is the foundation for the big, low-cost output available to you from Marion.

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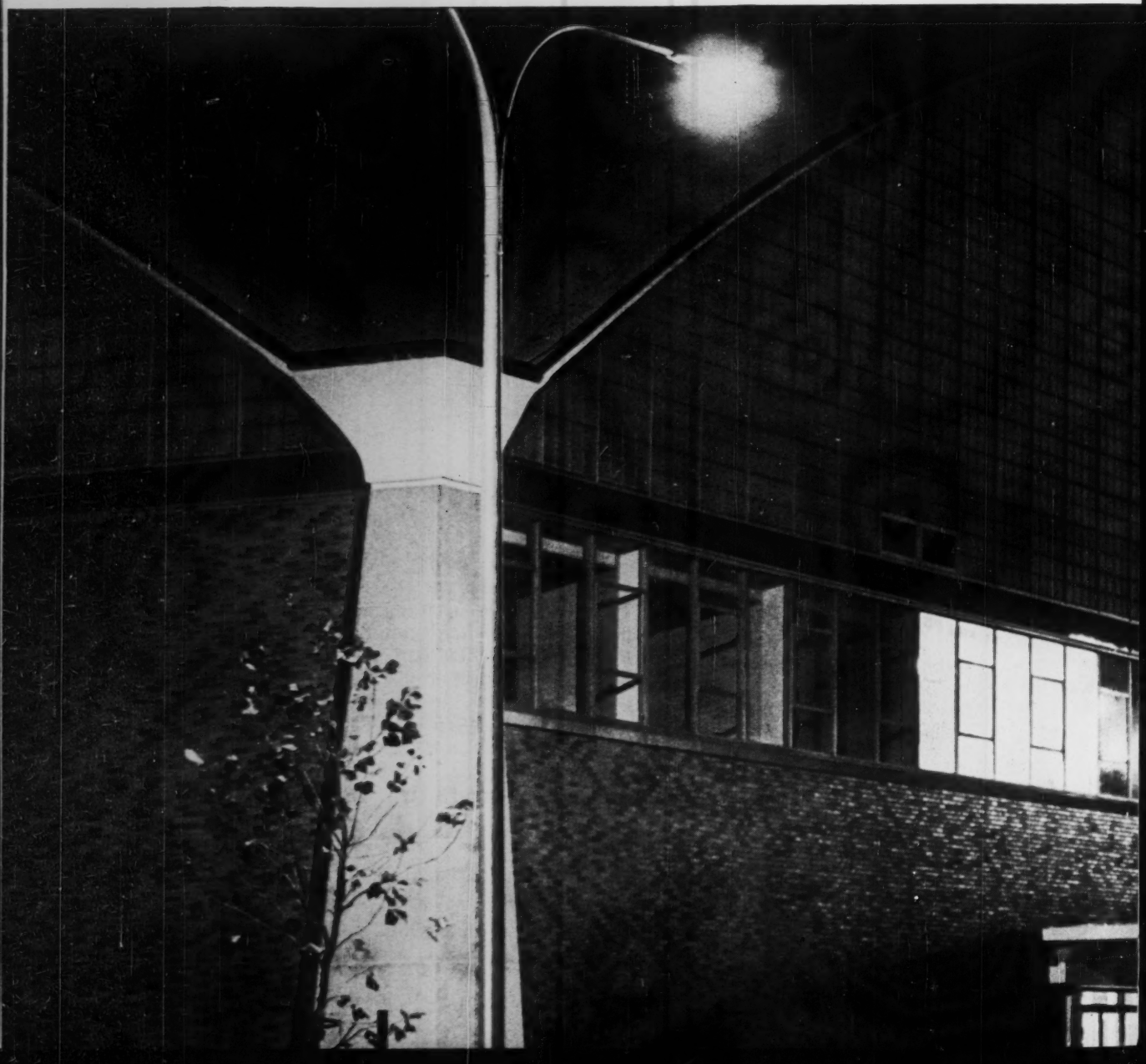
Westinghouse delivers dependable power to first automated U.S. Post Office

(Below) Functional, clean lines of the Providence Post Office exterior are highlighted by Westinghouse OV-25 parking area luminaires, assuring 24-hour maximum security operation. The luminaires' horizontal housing and tilted optical system are completely sealed against dirt, moisture and bugs for years of low maintenance, high efficiency operation.

J-94161-1



The nation's first automated post office, labeled "Project Turnkey," is operating now in Providence, R.I. It represents the first step in the government's plan to make the complexity of mail handling completely automatic to insure 24-hour delivery of mail to any part of the country.

Behind the architectural beauty of this $20,000,000 facility is a vital electrical nervous system. And it's the sure, steady performance of Westinghouse electrical apparatus that keeps this marvel humming.

From dependable, maintenance-free outdoor luminaires that light the 14-acre site to 69 power and lighting panelboards that feed sensitive letter sorters, facing and cancelling machines, parcel post machine and conveyor system, Westinghouse products coordinate for the high degree

(continued on next page)

These 11 sorters distribute mail to bins for 300 separate destinations after an operator's key punch code has sent an impulse to the memory unit of the sorter. Other major machines in the system are six letter cullers, six facer-cancellers, two parcel post sorters, and over three miles of conveyors.

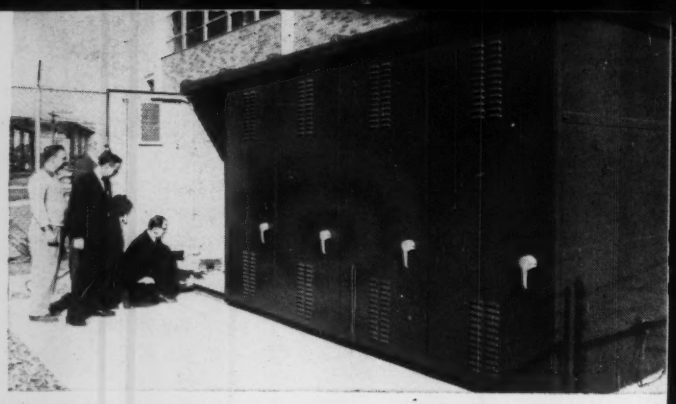
Owner: Intelex Systems, Inc. Architect-Engineers: Charles A. Maguire and Associates, Providence, R.I. General Contractor: Gilbane Building Company, Providence, R.I. Electrical Contractor: Brady Electrical Company, East Providence, R.I. Westinghouse Distributor: WESCO, Providence, R.I.

(continued from preceding pages)

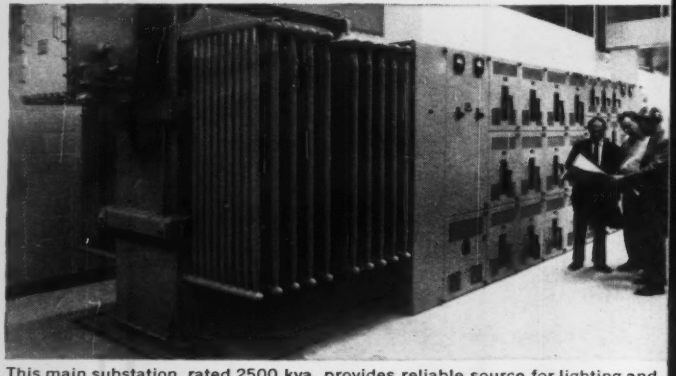
of service so important to this "Post Office of Tomorrow." It is estimated that 10,250,000 kilowatt hours of electrical energy will be required annually for the 24-hour operation of the plant.

The Gilbane Building Company, Providence, erected the structure for Intelex, a subsidiary of International Telephone & Telegraph, who will lease it and its mechanized mail processing equipment to the government for 20 years. Design was by Charles A. Maguire and Associates, Providence. Westinghouse personnel worked closely with the consulting engineer from design stages through completion. Experience and the completeness of the Westinghouse line earned this working role in mail handling history.

You can be *sure* . . . if it's Westinghouse!

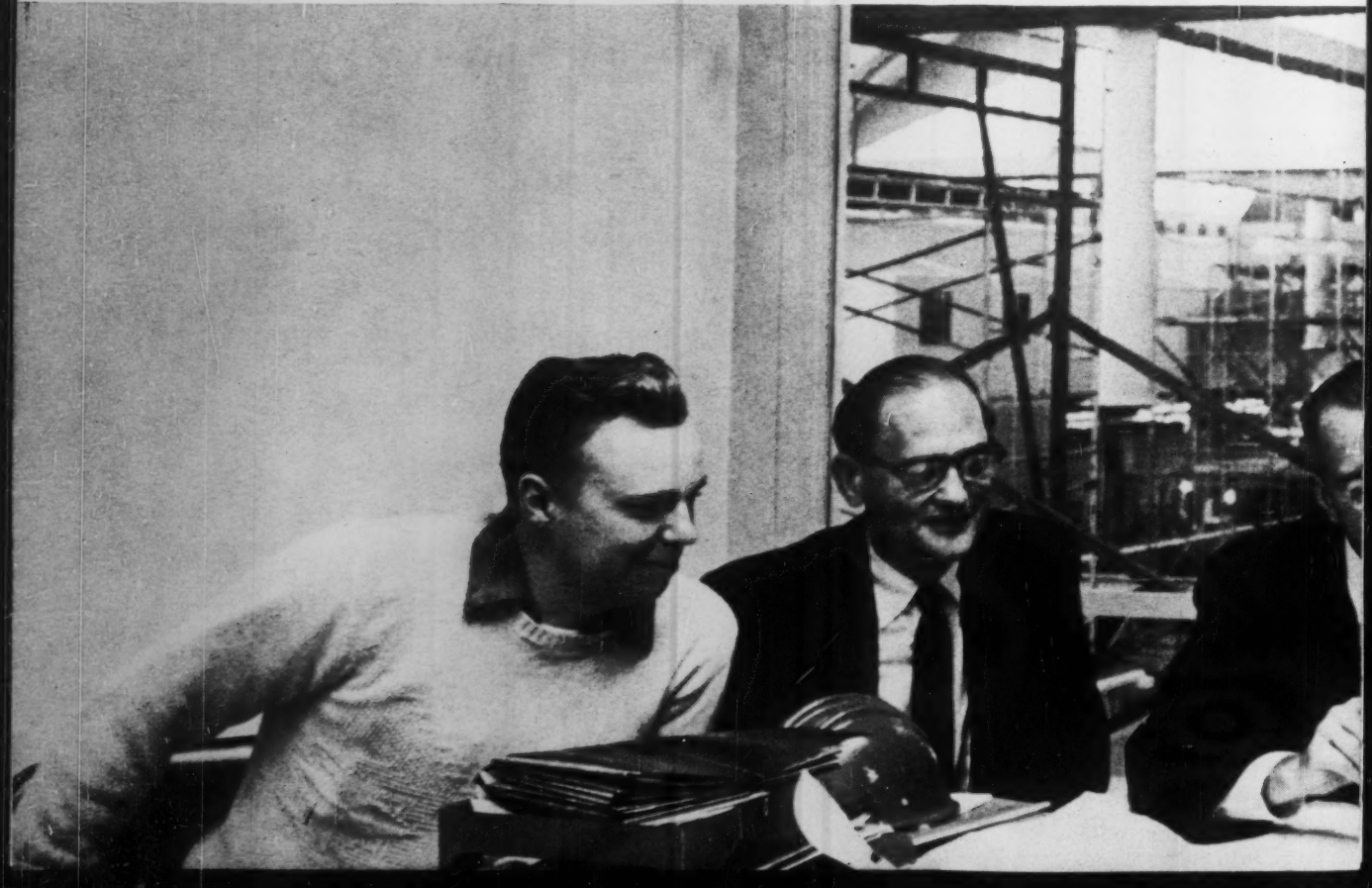


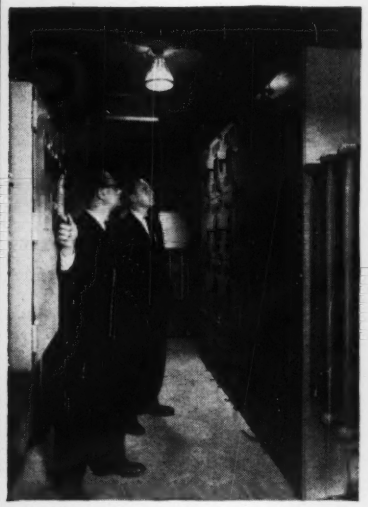
(Above) Rugged, weatherproof enclosure shields Westinghouse 150-DH-250 air circuit breakers which protect main feeders providing power to the post office. Inspecting breakers are A. A. Watson, W. W. Botts, R. W. MacArthur, and A. I. Israel (kneeling).



This main substation, rated 2500 kva, provides reliable source for lighting and power circuits. It receives incoming power at 11 kv directly from outdoor metal clad switchgear. Discussing schematic drawings of power circuits are: A. I. Israel, A. A. Watson and R. McCloskey, Resident Engineer, Charles A. Maguire and Associates.

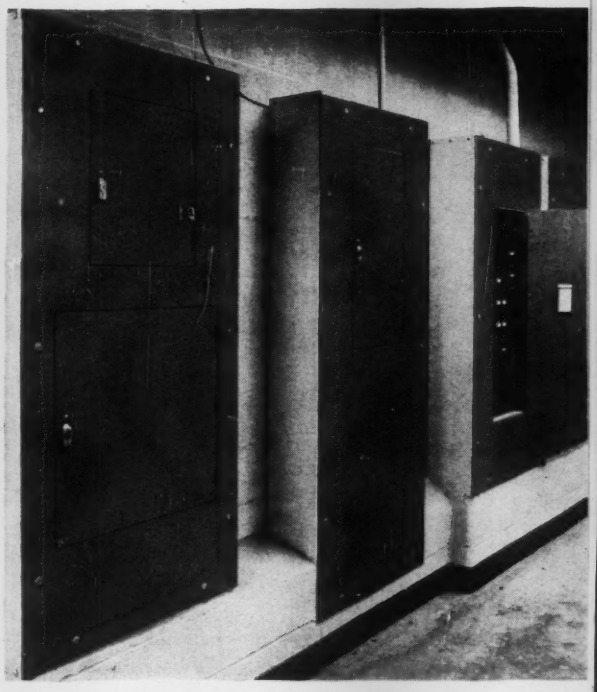
(Below) Reviewing drawings during the construction of Project Turnkey are, left to right: Arthur A. Watson, General Foreman, Brady Electrical Co., Inc.; A. I. Israel, Charles A. Maguire and Associates; E. Howard Rohrbach, Project Manager, Intelex Systems; Richard F. Martin, Project Manager, Gilbane Building Company; R. W. MacArthur, Westinghouse; and Walter W. Botts, Manager WESCO, Providence.





(Above) A. I. Israel operates remote circuit breaker control panel for 15 kv outdoor metal clad switchgear as R. W. MacArthur looks on. Switchgear furnishes incoming power safely and efficiently to Westinghouse 500 kva power center serving post office auxiliaries. Compact design permitted location in minimum space, freeing valuable footage for work areas.

A. I. Israel, left, and W. W. Botts discuss operation of electrical system in mechanical building. In foreground is a 60 hp, 208 volt drip-proof Westinghouse motor, driving a chilled water pump. 400 amp safety switch on wall feeds an autotransformer reduced voltage starter which cushions inrush current to assure smooth pump start-up.



Westinghouse CDP power distribution panelboards equipped with De-ion® circuit breakers control and protect feeder circuits supplying power to intricate mail handling equipment. Complex systematized handling system requires reliable power supply since local failures would seriously impair movement schedules. Famed De-ion principle of arc quenching assures maximum circuit breaker life by preventing burning and pitting contacts.

Westinghouse

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Obituaries

Henry J. Kaiser, Jr., 44, vice president and director of Kaiser Industries. Second son of Henry J. Kaiser, Sr., he took an active part in many of the Kaiser construction activities. He was a vice president and director of Kaiser Steel Corp., Kaiser Hawaii Kai Development Co., Kaiser Center, Inc.; a director of Kaiser Engineers International, Inc., Kaiser Engineers Overseas Corp., Kaiser Engineers and Constructors, Inc., Kaiser Engineers Pan American, Inc., and Kaiser International, Ltd.

George Suderow, 48, vice president and chief engineer of DeLong Corp., New York City. He helped design the original Distant Early Warning system in the arctic and was in charge of designing the first offshore Texas tower radar station, which stands off Cape Cod. Before joining DeLong 10 years ago, he was with the engineering firms of G. E. Suderow, Inc., and Sedgwick, Demarest & Suderow.

John G. Gruss, 67, retired vice president of Albright & Friel, a Philadelphia firm of consulting engineers. A specialist in sanitary engineering, Mr. Gruss designed a major phase of the $35-million Schuykill River cleanup project.

H. F. Wiedeman, 65, president of Wiedeman & Singleton, consultants to Atlanta and other cities on water works and sewer system installations. The firm, founded in 1927, has designed all of Atlanta's major water and sewerage installations since then.

Grady S. Harrell, 72, member of the North Carolina state board of examiners for engineers and land surveyors since 1941. A registered surveyor since 1921, he was a past chairman of the National Congress of Surveying and Mapping.

Warren R. Neal, 78, one of the founders and long-time chief engineer of the Georgia Highway Department. He helped organize the department in 1916 and was its chief engineer from 1919 to 1930. After 17 years of private work as an airport builder, he returned to head the department from 1947 to 1948.

Grant H. Potter, 61, former senior partner of Charles A. Maguire Associates, Providence, R. I., engineering consulting firm. After working as chief engineer for the federal Works Progress Administration in Rhode Island, he joined the Maguire firm in 1938, becoming a partner in 1942 and senior partner in 1954. He retired last year.

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*Based on DuPont "MYLAR" polyester film.

CAMBRIDGE HALL,
IGAYA, HALL & JONGS
TOKYO, JAPAN
CONTRACTOR — ENGINEER

On being questioned as to where his firm intended to put the new, two million dollar Biology Laboratory for Itchi U., Hall replied in confidence:

"Nowhere else but on Arkwright. We're just waiting for the committee to work some of the bugs out of their preliminary plans, and then we'll lay it out. Could be either tracing cloth or drafting film. You know Arkwright gives you a quality surface on both. We like those sharp, clear lines . . . that permanent translucency . . . that resistance to wear and tear. You ought to try it . . . Arkwright."

For perfect performance on cloth, specify the roll with the blue line — Arkwright. See for yourself the advantages of Arkwright's perfect coated surface on drafting film. Film available in several thicknesses. Both cloth and film in cut sheets or rolls. Write today for free samples.

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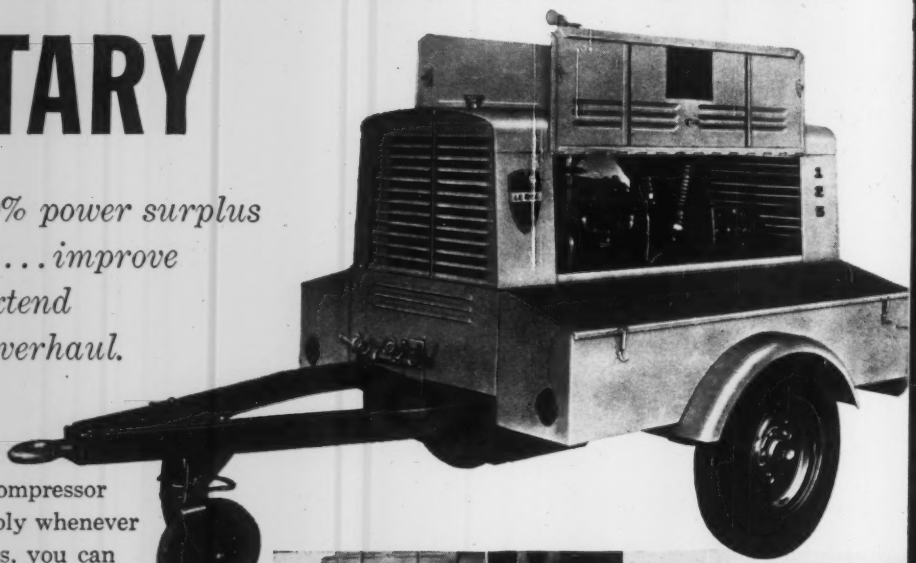
Arkwright-Interlaken Inc.

NEW MORE POWERFUL LE ROI 125 ROTARY

15% more hp and 60% power surplus assure capacity output... improve efficiency... and extend time between engine overhaul.



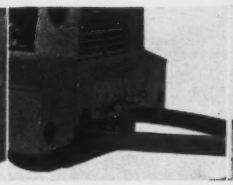
This new Le Roi 125 Rotary compressor guarantees full 125-cfm air supply whenever and wherever you need it. Thus, you can replace two smaller machines *and operators* with a single 125. And you don't have to waste a larger compressor on jobs where 125-cfm air supply is adequate.

Extra power enables the engine to deliver full capacity at only 1600 rpm — 150 to 400 rpm slower than other makes. This cuts wear on both engine and compressor parts and reduces upkeep. What's more, the use of Stellite exhaust valves and valve seat inserts and positive valve rotators in the engine improves fuel economy and extends valve life.

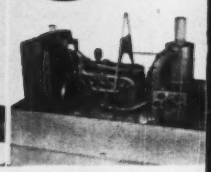
The new Le Roi 125 Rotary incorporates "double life" reversible rotors, a Le Roi exclusive. Spline couplings assure positive power transfer from engine to compressor and oil pump. Dump valve, minimum pressure orifice, low-oil-pressure cut-out switch, and thermo by-pass valve operate automatically, providing protection against down-time due to accident or neglect.

At 2190 lbs. dry weight, the Le Roi 125 is the lightest compressor in its class. It is designed for easy handling on the site and for fast inspection and servicing in the field. Gasoline and diesel models available on wheel mounts — and gasoline utility model for cross truck bed mounting. PC-101

MORE TOOL SPACE in lockable tool boxes on each side.



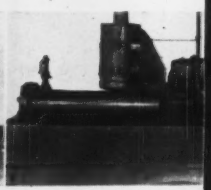
AIR SERVICE valves and hose connections are protected by tow bar.



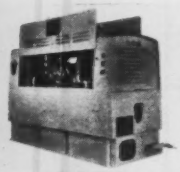
LIFTING BAIL permits easy safe overhead pickup.

PROTECTION against damage in transit assured by mounting radiator and oil cooler at tow-bar end.

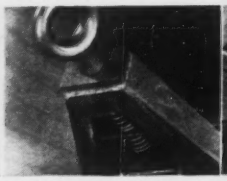
REMOVABLE HOOD can easily be lifted off by two men after loosening just 8 cap screws.



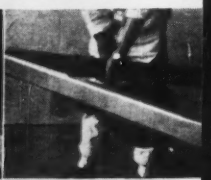
OIL SEPARATOR is independent of the receiver and easily accessible for changing separator element.



UTILITY MODEL is base mounted . . . all controls and service valves grouped for "curb-side" operation.

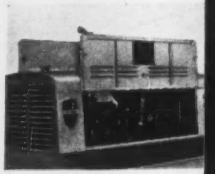


SWIVEL TOWING EYE is spring-loaded to ease towing strain over rough terrain and during acceleration.



STURDY THIRD WHEEL easily lifts out of way and locks for towing — no "knuckle-busting."

Ask your Le Roi Distributor for more information. Or write directly to us at the address below.



FOLDING PANELS lock up and out-of-the-way . . . aid operation and servicing.

LE ROI Division of Westinghouse Air Brake Co. Sidney, Ohio

How to Figure Labor Time

ESTIMATOR'S GENERAL CONSTUCTION MAN-HOUR MANUAL—By John S. Page. 218 pages. Gulf Publishing Co., P.O. Box 2608, Houston 1, Texas. $10.

The manual consists principally of tables giving the number of man-hours required for a large variety of construction tasks. But an invaluable part of this book is the introduction, which explains how to use the tables in estimating construction costs.

The cost of direct labor can be computed for each task by applying to the number of man-hours read from the appropriate table unit hourly wage rates for the locality in which construction is to take place. To this cost must be added the cost of supervisory personnel. From this sum, a composite rate can be computed for a crew assigned to the task. Application of this rate to the time required to do the job yields the labor cost.

The man-hours given in the tables are based on a productivity efficiency of 55% for bricklayers and 70% for all other workmen. Table values must be corrected for each project for efficiency anticipated.

As a guide in making this correction, the author suggests five ranges of productivity efficiency—from very low (10% to 40%) to excellent (91% to 100%.

The author also calls attention to six major factors affecting efficiency—general economy, project supervision, labor relations, job conditions, equipment and weather. Thus, exercise of judgment is limited principally to the estimate of efficiency, while other main elements of construction estimates are based on quantity take-offs of material from plans and man-hours taken from the tables, which are derived from field and shop experience.

The Engineer and the Law

IT'S THE LAW!—By Bernard Tomson. 436 pp. Channel Press, 159 Northern Boulevard, Great Neck, N. Y. $7.50.

Most books on laws affecting construction are aimed principally at contractors. Judge Tomson's book is a departure from this practice.

Most of the material in the book will be of interest to architects and engineers, though contractors' legal problems are not ignored.

The book opens with a general survey of statutes regulating the practice of architecture, engineering and construction. This part includes a discussion of the legalities of doing business in a foreign state.

Organization and business problems are taken up next. Here, a wide variety of topics are covered, such as partnership agreements, advantages and disadvantages of professional practice by corporations, establishing fees, standards of professional practice, and building codes.

The employment relation between architects, engineers, contractors and owners is discussed in subsequent chapters. Sample forms for agreements are given in an appendix. Following a discussion of rights and liabilities of designers and builders, the book closes with a look at restrictions placed by law on use of property—restrictive covenants and zoning.

The author is a district court judge in Nassau County, New York. The book was developed from material appearing in a monthly column by Judge Tomson in *Progressive Architecture*.

Manual on Water for Industry

MANUAL ON INDUSTRIAL WATER AND INDUSTRIAL WASTE WATER—STP 148-E. Second Edition. 686 pages. American Society for Testing Materials, Philadelphia, Pa. $11.

Designed as a dependable reference source on water and the problems involved in water use, this expanded version of the first edition contains new chapters on how streams assimilate wastes and on industrial use of radioactive nuclides. Standards have also been added on operating performance of cation-exchange materials—sodium cycle, and phenolic compounds in industrial water and industrial waste water.

Comprehensive treatment is given to such subjects as treatment of process water and waste water, procedures and precautions to be observed in sampling analysis and examination of water and water-formed deposits.

The final portion of the book is given over to the 84 methods for examination of water currently accepted by ASTM.

Runway Manual

DESIGN OF CONCRETE PAVEMENTS FOR AIRPORTS—Wire Reinforcement Institute, 1049 National Press Bldg., Washington 4, D. C. 96 pages.

This manual is intended as a reference for engineers responsible for the structural design of concrete pavements reinforced with welded wire fabric.

The handbook covers these major topics: basic factors in design; concrete pavement design fundamentals; subgrade, subbase and drainage; pavement thickness; design of reinforcement; construction practices; concrete overlays; and welded wire fabric data.

Current requirements of the U. S. Federal Aviation Agency were followed closely in preparation of the manual. Thus it is especially applicable to the design of concrete pavements for civil airports.

Water Inventory

INVENTORY OF WATER FACILITIES IN THE U. S.—By U. S. Public Health Service. Four volumes of a nine-volume set. Superintendent of Documents, Washington 25, D. C. Each volume costs less than a dollar.

The inventory lists the water facilities of about 20,000 U.S. communities with populations over 100. Information is given about ownership, age of equipment, type of laboratory control, number of meters, source of supply and safe yield of water and types of water treatment. Also included are names of communities that have no public water supply. These communities, together with others that will be replacing old equipment, will probably be investing some $2 billion annually within the next 20 years.

Photogrammetric Basics

ELEMENTS OF PHOTOGRAMMETRY—by Wilfred H. Baker. 199 pages. Ronald Press Co., New York, N. Y. $5.

Professor Baker developed this book out of years of teaching an elementary course in photogrammetry to civil engineering students. He emphasizes basic principles, particularly with respect to the vertical photograph and the stereoscope.

More complex plotting instruments are introduced to stimulate further reading.

Photogrammetry is followed through planning, flight, photography, ground control, interpretation and use of the photographs. Numerical problems and laboratory exercises are included.

POWER C 'PULL* gives you these production advantages:

TOP POWER/WT RATIO: The LeTourneau-Westinghouse C Tournapull® is powered by the GM 8V-71 diesel engine producing 290 hp. Combined with "C's" light weight, each "horse" moves only 304 lbs of total loaded weight. That's almost 93 pounds less than the average for all single-engine scrapers in this class. You accelerate 20% faster, complete cycles in less time.

EASIER OPERATION: Exclusive LW electric-control system gives you positive, *instant-response* control of steer, tailgate, apron, and bowl lift. It's the easiest-to-operate, easiest-to-maintain system of all . . . and 100% weather-proof.

FASTER LOADING: Fullpak® scraper has been proven to load a *greater* percentage of its heaped capacity than any other unit on the market. Low-angle loading, with wide entry for dirt . . . 20 yd heaped, 14 yd struck.

GREATER SAFETY: C'Pull gives you biggest brakes in the industry (3,764 sq in.), excellent visibility, and electric power steer that is never hampered by the operation of any other controls.

LOW OPERATING COSTS: You save money *every work day* because of "C's" simple, rugged design, easy accessibility of component parts, minimum of lubrication points, and low requirements for fuel, cable, oil, and tires.

More reasons why C 'Pull moves more dirt at less cost:

LW Power-Transfer Differential — automatically transfers power from slipping drive wheel to wheel on firmer footing, keeps production high on soft, slippery terrain, on slopes and curves.

Power saving features — special radiator fan needs 7 hp less than other types. Drive train is short-coupled, runs on anti-friction bearings. Electric controls use power *only* when operating.

More maneuverability — electric kingpin power steer can U-turn C Tournapull in less than its own length, for fast, easy maneuvering in tight quarters, narrow haul roads.

Interchangeability — convert from 20-yd scraper to 22-ton rear-dump hauler in a matter of hours... C prime-mover earns bigger profits.

Unequalled experience — because of the experience gained in designing, engineering and building C Tournapulls over the past 20 years, today's V-Power C 'Pull is the *most up-to-date, fully job-proved scraper on the market!*

Let us show you the V-Power C 'Pull in action. See for yourself how it can cut your costs, help you make bigger profits. See us soon.

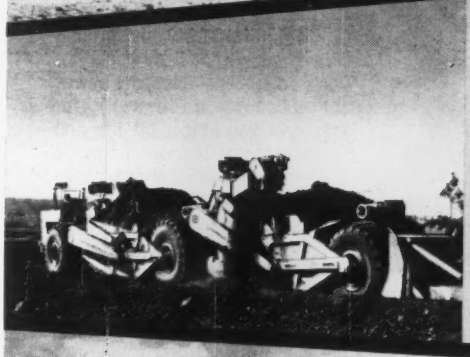
There's a 'Pull to fit every job

LW Speedpull®

For top-performance on long-haul assignments. 276 hp, 20-yd heaped capacity, 37.7-mph speeds, exclusive Hydrair® suspension, best power-to-weight ratio, many other LW advantages.

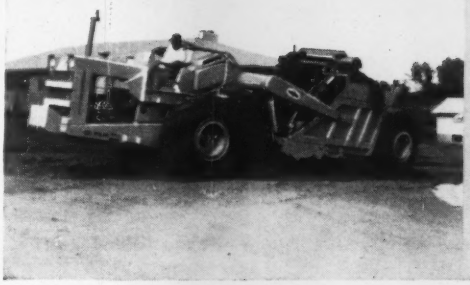
LW V-Power B 'Pull

Puts more production, new profits into big-scraper dirt-moving with: More power... 430 hp. New speed... up to 28.3 mph. New capacity... 23 yds struck, 29 yds heaped... 58 yds in tandem.



LW Tandems

With LW electric-control system you can use two scrapers behind *any* 'Pull prime-mover... double your load capacity at only 30% extra cost! Plug-in jacks, and simple swivel hitch let you add or take off second scraper in a matter of minutes.



LW D Tournapull

Money-maker on *any* size job with standard 9-yd LW scraper ... or with 10-yd Hancock elevating scraper (shown). 143 hp ... choice of constant-mesh or torque-converter transmission ... speeds up to 30 mph.

*Trademark CP-2370-DC-2

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A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

AT LAST, completely successful core drilling is a reality... thanks to Clipper

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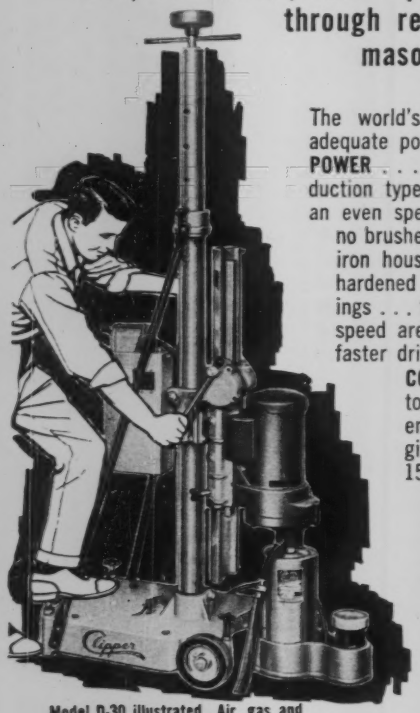
now, in minutes, holes up to 14" in diameter through reinforced concrete, masonry, stone, refractories



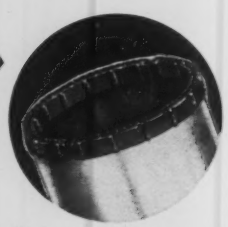
Model D-30 illustrated. Air, gas and electric models available—from $335.

The world's first core drill designed with adequate power at a constant speed. **POWER** . . . specially designed 3 h.p. G.E. induction type motor gives maximum power at an even speed . . . lifetime lubricated . . . no brushes to wear out. Mounted on a cast iron housing with extra large, heavy duty hardened steel gears . . . anti-friction bearings . . . free from maintenance. Power and speed are essential for longer bit life and faster drilling.

CONSTANT SPEED . . . it is essential to vary the speed when using different sized bits. Clipper core drill gives you a choice of 300, 800, 1500 R.P.M. — a must when drilling through reinforced concrete. Don't be misled—adequate power and speed are necessary, for they give you longer bit life and faster drilling. Compare Clipper's drill with the limited duty hand drill motor that has insufficient power, has lightweight housing and gears, and slows down under load.

ORIENTED SURFACE SET RESETTABLE BITS give maximum bit life in hardest steel reinforced concrete.

SURFACE SET "THROW-A-WAY" BITS—Combine drilling speed of resettable bit with convenience of "throw-a-way" bits.



IMPREGNATED "THROW-A-WAY" BITS where low initial cost is essential, are also available.

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LOCKWOOD GREENE: THE HISTORY OF AN ENGINEERING BUSINESS 1832-1958 — by Samuel B. Lincoln. 861 pages. The Stephen Greene Press, Brattleboro, Vt. $10.00.

CONCRETE ENGINEERING HANDBOOK—McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N. Y. $25.00.

COMMUNITY BUILDERS HANDBOOK — 476 pages. Urban Land Institute, 1200 18th St., N.W., Washington 6, D. C. $15.00.

MANUAL OF LATHING AND PLASTERING—by John R. Diehl. 366 pages. National Bureau for Lathing and Plastering, 200 K St., N. W., Washington 5, D. C. $7.50.

BOILERS: TYPES, CHARACTERISTICS, AND FUNCTIONS—by Carl D. Shields. 559 pages. F. W. Dodge Corp., 119 West 40th St., New York 18, N. Y. $15.00.

AMERICAN BUILDING ART—THE TWENTIETH CENTURY—by Carl W. Condit. 427 pages. Oxford University Press, 417 Fifth Ave, New York 16, N. Y. $15.00.

FARM BUILDING DESIGN—by Loren W. Neubauer and Harry B. Walker. 611 pages. Prentice Hall Inc., Englewood Cliffs, N. J. $12.00.

RARE METALS HANDBOOK (Second Edition) —Clifford A. Hampel, Editor. 715 pages. Reinhold Publishing Corporation, 430 Park Ave, New York 22, N. Y. $20.00.

INTRODUCTORY SOIL MECHANICS AND FOUNDATIONS (Second Edition)—by George B. Sowers and George F. Sowers. 386 pages. The Macmillan Co. 60 Fifth Ave. New York 11, N. Y. $8.00.

FOUNDATION FAILURES—by C. Szechy, D. Sc. 142 pages. Concrete Publications Ltd., 14 Dartmouth Street, London S. W. 1. England. $3.00.

A GUIDE TO THE B.S. CODE OF PRACTICE FOR PRESTRESSED CONCRETE—by F. Walley M.Sc., A.M.I.C.E., and S.C.C. Bate B.Sc., Ph.D., A.M.I.C.E. 104 pages. Concrete Publications Ltd. 14 Dartmouth Street, London S.W.1, England. $3.00

BASIC HUMAN FACTORS FOR ENGINEERS—by Paul A. Verdier. Exposition Press, Inc., 386 Fourth Ave., New York 16, N.Y. $4.00.

MACHINE DRAWING AND DESIGN—by W. Abbott. 281 pages. Blackie & Son Limited, 17 Stanhope St., Glasgow, C.4, Scotland. 21s.

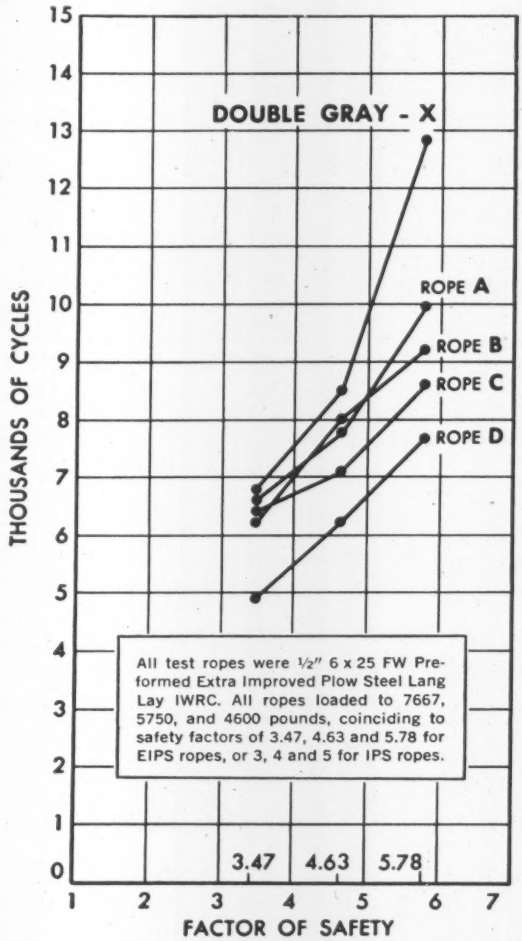
FROM THEORY TO PRACTICE IN SOIL MECHANICS: Selections from the writings of Karl Terzaghi—425 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y. $12.00.

DOUBLE GRAY-X® lasts longer

Tests prove CF&I-Wickwire's premium wire rope has 45%* more bending life than average of other ropes tested

In an extended series of tests conducted at CF&I's Palmer Plant, five brands of wire rope were tested to destruction on a 25,000-pound fatigue machine that bends wire rope back and forth over sheaves until it breaks.

All the ropes tested were made by major manufacturers, and were identical in size and specification. And all exceeded the catalog-breaking strength of extra-improved plow steel rope. But, as the chart indicates, one rope outlasted all the others at every safety factor used in the test. That rope was Double Gray-X!



At the highest and most commonly-used safety factor, CF&I-Wickwire's premium wire rope lasted 30% longer than the rope that survived next longest, and 68% longer than the rope that lasted the shortest length of time. Double Gray-X lasted 45% longer than the average of all other ropes tested at this safety factor.

Double Gray-X has greater resistance to bending fatigue, the chief enemy of wire rope life, because it is the result of a breakthrough in wire-drawing technology. The use of molybdenum disulphide in the drawing process produces these outstanding fatigue-resistance factors:

- A Molecular Shield . . . which prevents the wires from grinding together as the rope operates.
- Smoother Wire Surfaces . . . providing better resistance to fatigue.
- Extra Toughness . . . because molybdenum disulphide helps preserve the inherent toughness of the wire during drawing.

Double Gray-X can save you money because it lasts longer on even the most punishing jobs, as proved by these tests and by field reports from satisfied users. This longer-lasting wire rope cuts repair and replacement costs, lowers your total wire rope investment and reduces machine downtime. Use the wire rope of *tomorrow* today! Ask your CF&I salesman for complete details.

*Percentage above average of all other wire ropes tested at safety factor of 5.78.

The Colorado Fuel and Iron Corporation

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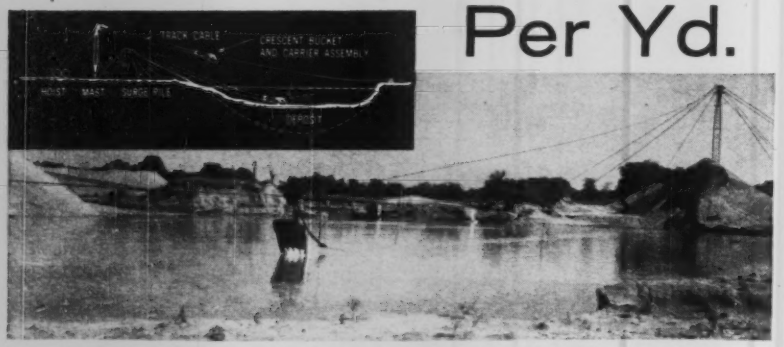
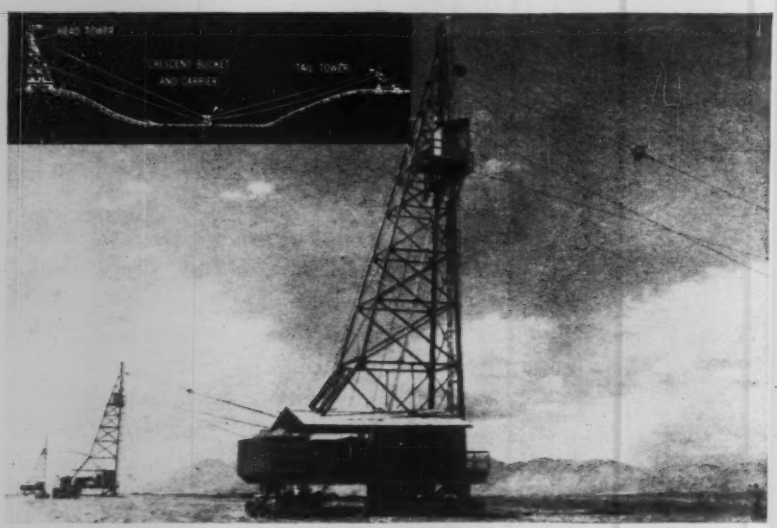
Dig and Haul for 8¢ Per Yd.



Sauerman Slackline Cableway excavating hard-to-dig flat rock from 70 ft. of water. Average hauls are 450 ft. to a surge pile which provides a ready reserve for processing. It also allows digging and hauling to continue when the plant or other equipment is down due to weather or other stoppage. Slacklines can dig from ground level to 125 ft. below water, operate over spans up to 1000 ft. Costs from pit to pile average about 8¢ per yd. including labor, power and maintenance.



Sauerman Tower DragScrapers, each equipped with a 5-yd. Crescent bucket, digging and hauling from a lake-bottom deposit. Each 100-ft. head tower is mounted on four sets of tracks. Operating span averages about 1000 ft. The high water table and occasional flooding of the fill area make the job an excellent one for Sauerman Machines, as the wet, sticky material does not provide good footing for wheeled equipment.

Sauerman Machines . . . work high banks . . . deep pits . . . or under water. In most cases, one operator handles digging and hauling from excavation point to hopper or surge pile. Controls can be remotely located for maximum visibility of material and plant.

Request recommendations on your material handling job. Ask for Catalog A for information on Drag-Scrapers in sizes to 15 yds. and Catalog C for information on Slackline Cableways in sizes to 3½ yds.

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Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

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ESTIMATOR'S GENERAL CONSTRUCTION MAN-HOUR MANUAL—by John S. Page. 218 pages. Gulf Publishing Co., Book Division, 3301 Buffalo Drive, Houston 1, Tex. $10.00.

WATER SUPPLY: ECONOMICS, TECHNOLOGY AND POLICY—by Jack Hirshleifer, James C. DeHaven and Jerome W. Milliman. 400 pages. University of Chicago Press, 5750 Ellis Ave., Chicago 37, Ill. $7.50.

MANUAL OF LATHING AND PLASTERING—by John R. Diehl. 366 pages. Mr. John K. Buster, Executive Director, National Bureau for Lathing and Plastering, 2000 K St., N.W., Washington 6, D.C.

ERECTING STRUCTURAL STEEL—by Samuel P. Oppenheimer. 264 pages. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N.Y. $9.50.

COST ENGINEERING IN THE PROCESS INDUSTRIES—475 pages. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N.Y. $11.00.

STANDARD MANUAL OF EXPENSE ACCOUNTS FOR SHOPPING CENTERS—26 pages. Urban Land Institute, 1200 18th St., N.W., Washington 6, D. C. $5.00.

LANDSCAPE ARCHITECTURE—by John Ormsbee Simonds. 244 pages. F. W. Dodge Corporation, 119 West 40th St., New York 18, N. Y. $12.75.

MATHEMATICAL HANDBOOK FOR SCIENTISTS AND ENGINEERS—by Granino A. Korn and Theresa M. Korn. 943 pages. McGraw-Hill Publishing Co., 330 West 42nd St., New York 36, N. Y. $20.00.

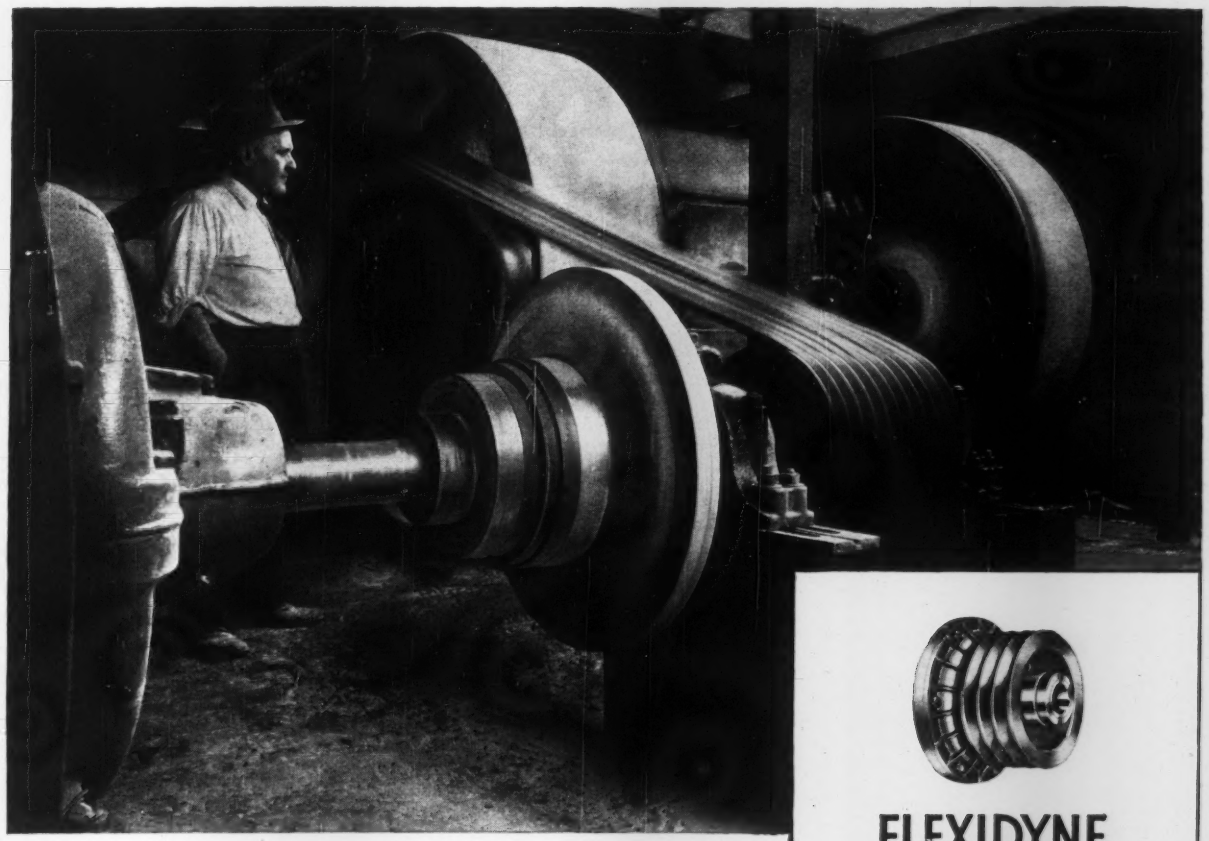
AIR POLLUTION: WORLD HEALTH ORGANIZATION—442 pages. Columbia University Press, 2960 Broadway, New York 27, N. Y. $10.00.

PROCEEDINGS OF THE NATIONAL CONFERENCE ON WATER POLLUTION—607 pages. Publication No. 819. Superintendent of Documents, Washington 25, D. C. $2.25.

WEIGHT-STRENGTH ANALYSIS OF AIRCRAFT STRUCTURES—by F. R. Shanley. 404 pages. Dover Publications, Inc., 180 Varick St., New York 14, N. Y. $2.45 (paper-bound).

GUIDE TO U. S. GOVERNMENT STATISTICS—Third revised edition. 402 pages. Documents Index, Box 453, Arlington 10, Va. $15.00 (paper-bound; 10% discount for cash orders).

1956 BIBLIOGRAPHIC SURVEY OF CORROSION—Publication No. 60-12. 248 pages. National Association of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Tex. Members $22.50; non-members $27.50.



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– and no reduced voltage starter!

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Introduce Flexidyne into your drive system and your stubborn loads take off smoothly, without the necessity of oversize motors or costly controls. Flexidyne provides the equivalent of a "no load" start, reduces maintenance, protects motors against shock or overload, and operates at 100% efficiency at full load speed!

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Flexidyne is available from stock in 8 drive sizes and 10 coupling sizes for capacities to 1000 hp. Ask your Dodge Distributor, or write us for complete technical bulletin.

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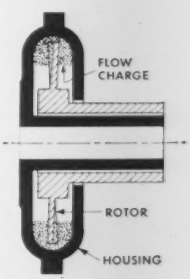
After the starting period of slippage between housing and rotor the two become locked together and achieve full load speed, operating without slip and at *100% efficiency*.



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By the time most grating is erected, much of the normal factory-applied coating is worn off. Unless it is repainted at once, costly corrosion starts to take its toll.

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This is the most rugged, durable finish available on gratings today. It has greater resistance to wear, abrasion, corrosion, chemicals and weathering than any other. Costs less than on-the-job painting. Write if you would like more information, or ask for a Blaw-Knox Grating salesman to show you a sample.

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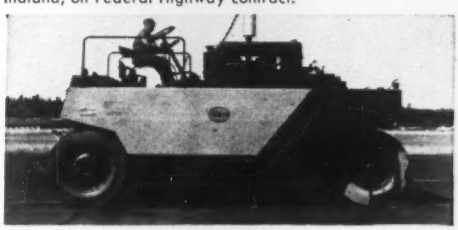
BROS 30-TON SELF PROPELLED PNEUMATIC TIRE ROLLER

BROS SP730B roller, ready for delivery to U.S. Navy. Also manufactured in Australia and Brazil, hundreds are in use around the world.

Subbase compaction, BROS SP730B equipped with tread tires, as used by Bernes Construction Co., Indianapolis, Indiana, on Federal Highway contract.



BROS SP730B at work on Gardermoen Air Field, near Oslo, Norway. Korsbrekke and Lorck and Nordiske Destillationsverker A/S were cooperating contractors.

BROS SP730B compacts 9" loose calcium-chloride treated base material to 6" in experimental job of Highway Surfacers, New Hampton, Iowa.

- Developed to provide compaction in all courses to match pressures of dual-wheeled over-the-road trailer trucks. 1957 Ohio tests showed that with 8500 lb. wheel loads on 3" hot mix asphalt concrete, random tests of void content varied less than 2%, core samples averaged 99.9% of design.
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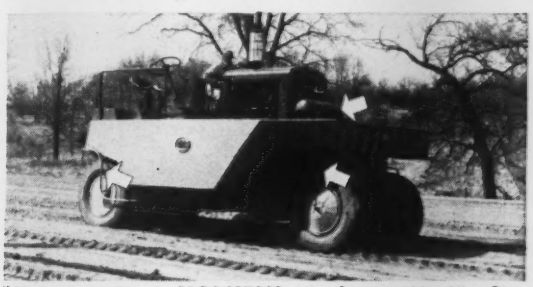
- Minneapolis Belt Line job showed roller achieved over-specification Marshall densities, and after one night's heavy traffic, could further increase density the next day with repeat rolling.
- 1959: "test rolling," another first for BROS SP730B self propelled pneumatic tire roller. It has been widely used for test rolling or proof procedures to meet state specifications requirements.
- 1960—BROS engineers perfect "air-on-the-run" for SP730B, allowing tire pressures to be raised or lowered from 30 to 100 psi without stopping, without changing ballast. Adapter kits offered for all SP730B's already in use.
- Iowa experimental project shows lower construction costs, superior base obtained, with calcium-chloride added to base material and rolled immediately with the BROS SP730B.



"Air-on-the-run" on the BROS SP730B roller, first tested by Alley Construction Co., Faribault, Minn.

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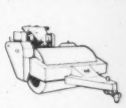

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35-100 TON ROLL-O-PACTOR

BROS Products also manufactured in Australia and Brazil

CONCRETE PERFORMANCE REPORT:

Controlled performance concrete was needed for TWA Terminal roof shell

The 5500 ton roof of Eero Saarinen's distinctive TWA terminal at Idlewild Airport is an arch cantilever design—with four monolithic concrete shells, joined integrally at the centerplate, flowing out of four sculptured concrete buttresses. Every detail of the terminal building performs an engineering function . . . a perfect wedding of form and structure that carries design loads gracefully down to the ground.

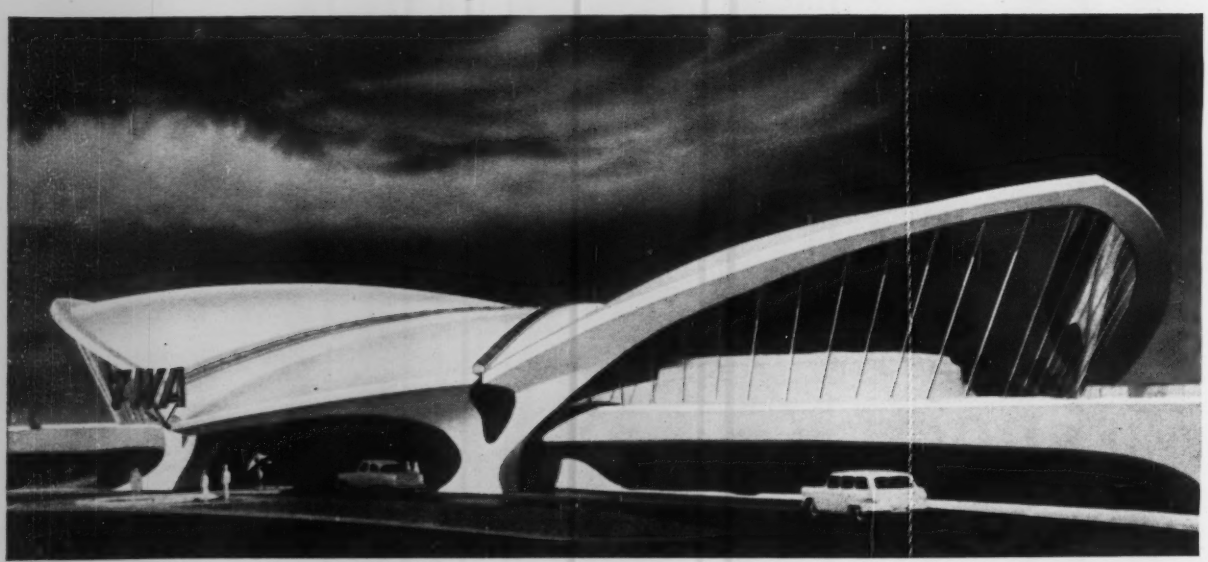
Consideration for concrete mixes—In proportioning the 4000 psi conventional concrete for the buttresses and lightweight concrete for the shells, special consideration was given to these factors: (1) lowest possible unit water content and low cement content to minimize shrinkage (2) careful control of slump which had to be varied for different areas of the shell (3) precise control of setting time to assure a completely monolithic structure for each shell and to allow finishing the surface to the final complex architectural contours. Also, in the buttresses and thick sections of the shell a low rate of heat evolution was required to minimize thermal stresses.

Test models—Three test models were constructed to simulate the placing conditions that would be experienced in different areas of the shell. These duplicated the angle of incline and the contours of the shell and the amount of intricate reinforcing steel in these areas. Work with these models showed that top forms had to be used where the slope of the shell was steep and that 5″ slump was necessary to place the concrete beneath the counterform. In the less steep areas where counterforms were not necessary, the concrete could be placed with 3″ slump without flowing or sagging down the slope.

Mix proportions—Preliminary work showed that these objectives were best met with POZZOLITH concrete. The trap rock concrete for the buttresses contained 606 lbs. of cement, POZZOLITH Retarder, 6% entrained air and had a unit weight of 150 lbs. The Norlite lightweight concrete for the shells contained 614 lbs. of cement, POZZOLITH Retarder, and 23 gallons of water for the 5″ slump mix placed under the top forms. Air content was 6% and unit weight was 115 lbs. By simply regulating the amount of POZZOLITH Retarder for each individual load of concrete, the set was retarded, as required, in the range of one to four hours. The two batching stations got their instructions by field telephone from the concreting superintendent on the roof.

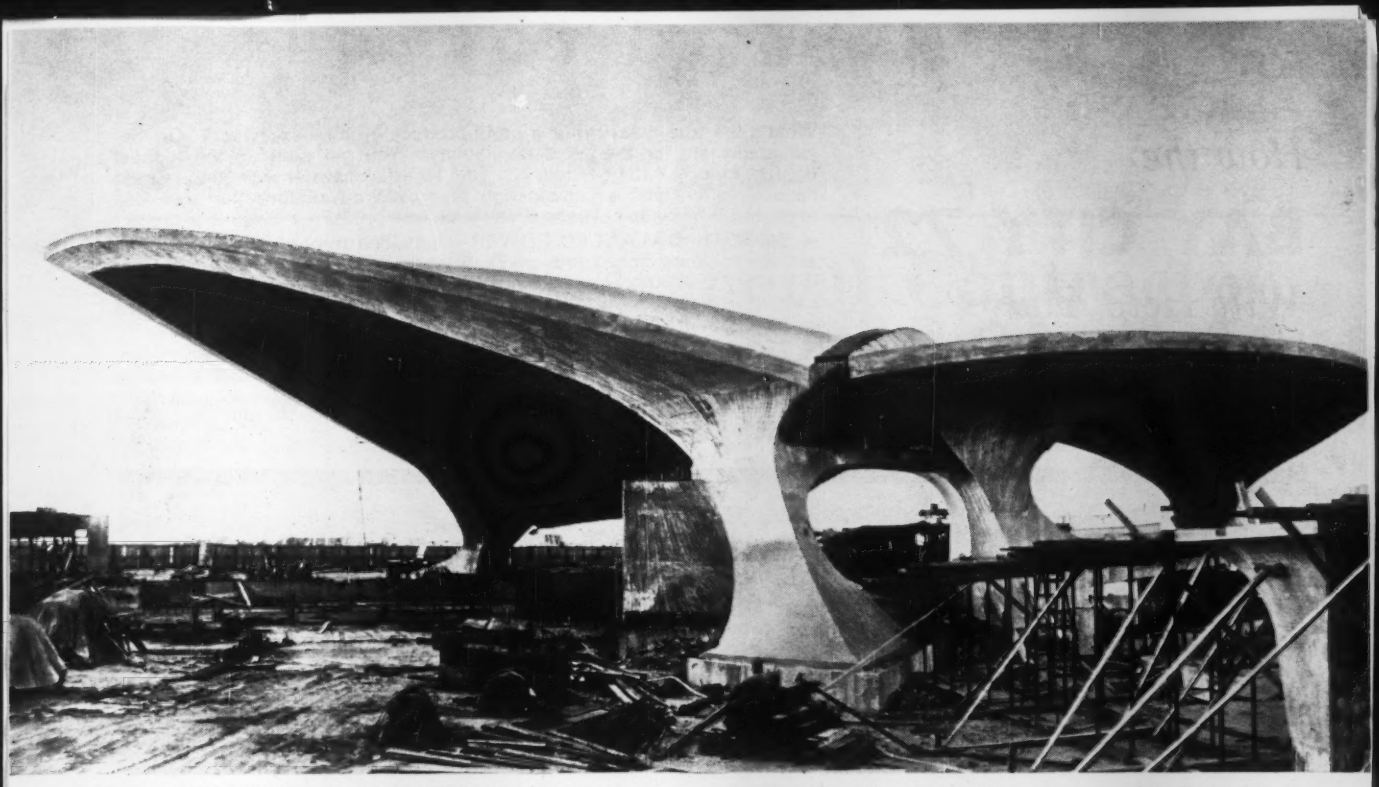
Results—Concrete was placed in a round-the-clock operation averaging 27 hours per shell. Removal of top forms proceeded on schedule. The concrete finished easily, with good texture and no plastic cracking. There

TWA



EERO SAARINEN'S MODEL of new TWA unit terminal, Idlewild Airport, New York. Two-and-one-half year project scheduled for completion in late 1961. 50,000 sq. ft. lightweight concrete roof shell—supported by only four concrete buttresses—weighs 5500 tons, contains 3200 cu. yd. of POZZOLITH concrete and 500 tons of steel.

Architect: Eero Saarinen & Associates • Supervising Resident Architect: Ralph Yeakel • Consulting Engineers: Ammann & Whitney—Boyd G. Anderson, Senior Partner in Charge • General Contractor: Grove, Shepherd, Wilson & Kruge, Inc.—Kenneth P. Morris, Field Project Manager • Testing: Haller Testing Laboratories, Inc.



NEW $15 MILLION SCULPTURE IN CONCRETE is as functional as it is breathtaking. Thickness of the lightweight concrete roof shell ranges from 8″ at the edges to 44″ at the centerplate. Each of the four huge shells is a continuous monolithic section.

TERMINAL

were no shrinkage cracks in the entire shell. 28 day strength tests averaged 5000 psi.

Master Builders fieldmen worked closely with the resident architect, engineer, contractor and ready-mix producer at the job site to achieve the common goal of maximum quality at lowest cost through controlled concrete performance.

FOUR CONCRETE BUTTRESSES support the massive shell. There are no internal columns. Buttress section is shown here after form stripping. Buttress surface will later be bush-hammered to the texture selected by Architect Eero Saarinen.

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Division of American-Marietta Company
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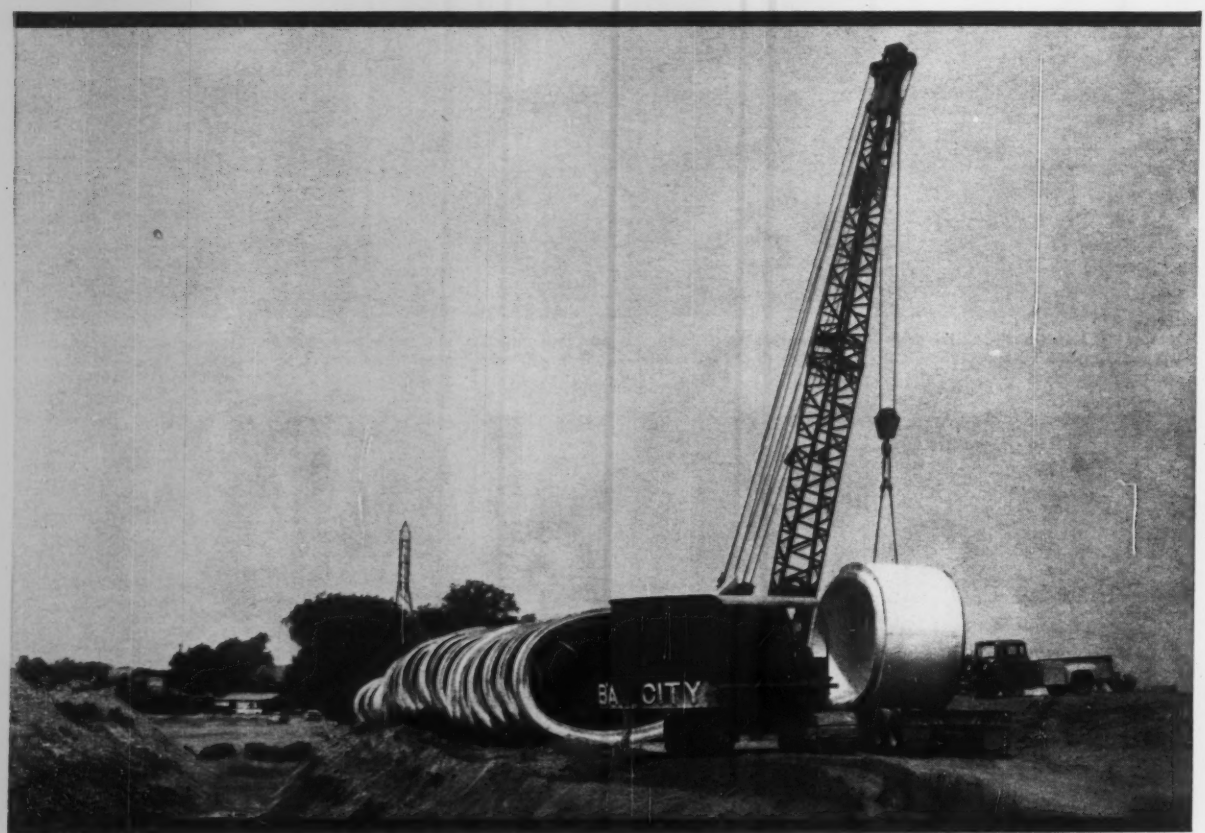
What's the true measure of a profit-producing crane-excavator? On-the-job ability and on-the-job dependability. You get both, in the highest degree, in a BAY CITY Model 72. This 1½-yd. excavator with 30-ton Crane capacity offers you a combination of proved advantages that can well make the difference between break-even and profit.

• **SMOOTH, BALANCED POWER** is provided through a fluid coupling and an enclosed speed reducing unit consisting of helical gears splined to shafts mounted on ball bearings. Running constantly in a bath of lubricant, this assembly gives longer life . . . eliminates adjustments required with a chain drive.

• **POWER CONTROLLED BOOSTERS** set main clutches with minimum hand lever pull. While easy to adjust, these clutches actually require less maintenance attention — there are no delicate mechanisms such as compressors, pumps, valves or tubing lines to cause trouble and slow down operations.



Here's a Model 72 in action during relocation of U. S. Hwy. 12 near Benton Harbor, Mich. The machine is working on a large drain section over which an overpass is to be built. Each 13-ft. dia. drain pipe weighs 22 tons.

• **CAST STEEL BASES** for lower works and revolving frame resist deflection . . . withstand shock loading . . . assure longer service with minimum maintenance. Roller and ball bearing mounting of all drums and shafts assures maximum transmission of power.

• **ALSO AVAILABLE AS ERECTION CRANE** with a fully independent boom hoist, power operated for both raising and lowering, an automatically set boom brake, a power load lowering device, a collapsible hi-gantry, pendant cable suspension, telescopic boom stops and pin-connected boom sections. This combination of features results in faster, safer load lifting and spotting . . . quicker, easier setups.

If you are planning on new equipment, there are many other Model 72 advantages you should know about. Have your BAY CITY dealer tell you what they are. Remember — there is a difference between promising bigger profit margins and actually delivering them!

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Liability of a General Contractor

A general contractor has a duty to provide safe ways and approaches for all laborers working under its subcontracts. The duty cannot be delegated. Workers injured as a result of the contractor's negligence can sue for damages.

An injured employee of a subcontractor was allowed damages against the general contractor in a New York case involving Ellis Chingos Construction Corp.

Chingos was engaged in the construction of the Meadow Drive Elementary School at Albertson, Long Island. The contract called for the construction of the building itself but it did not include the electrical, plumbing, heating and sheet metal work. The general contractor sublet fifteen parts of the work to other contractors.

Chingos had a superintendent on the job whose responsibility was to control its workmen and, in addition, to coordinate the work of the subcontractors. Robert Maceda was employed by the Atlas Erectors Co., a subcontractor engaged by one of Chingos' subcontractors to do the steel work on the building. His job was to assist in putting steel beams on the roof of the building. Once the steel was raised to the level of the roof, you would then go up a ladder in order to be able to get into a position on the walls to bolt the steel. After Maceda had ascended the ladder and had completed the work with the steel on the new section of the roof, he had to go down the ladder to set up another piece of steel. As he was going down the ladder, it gave way down on the bottom and started to slide under him. Maceda jumped to one of the bar hoists but couldn't hold on so he fell to the ground some fifteen to eighteen feet suffering severe injuries. He brought an action against the general contractor to recover damages for the injuries sustained and obtained a judgment.[1]

The court stated: "The contract which Chingos entered into with the owner was 'for the general construction of the building.' This, without more, was sufficient upon which to base a holding that Chingos (as to its subcontractors) was the general contractor even though there were other prime contractors on the job. A "general contractor, in building contract sense, is any person who contracts directly with the owner, the phrase not being limited to one undertaking to complete every part of the work.' 17 C. J. S. Contracts, Section 11, page 334."

The court pointed out that Chingos had the right and actually did direct the work of its various subcontractors. The ladder was in the same position for at least two days before the accident. It was being used by all laborers as the sole means of access from the floor of the structure to the roof. The bottom of the ladder extended some four to five feet from the bottom of the wall without any definite affixation to the wall or to the bottom gravel upon which it was standing. The general contractor could be charged with knowledge that under these conditions the ladder would slip.

The court referred to the cases of Tiller v. Paul Tishman Co., Inc., 3 A.D. 2d 769, 160 N.Y.S. 2d 546, and Shanahan v. Crestonia Construction Corporation, 207 App. Div. 785, affirmed 238 N.Y. 626, 144 N.E. 919, where under similar circumstances, a laborer was entitled to recover damages for injuries sustained as a result of the negligence of the general contractor.

(1) Maceda v. Ellis Chingos Construction Corp., 200 N.Y.S. 2d 720, N.Y. Supreme Court, March 8, 1960.

Damage Suits by Third Parties

A contract may give a person who is not a party to the contract a right to sue the contractor for damages caused by the contractor's blasting.

The rights of what the law calls "third party beneficiaries" are discussed by a New York case involving property damages that were caused by blasting operations during construction of a city sewer. The property owner sued the contractor for damages.

The contract contained a provision to the effect that the contractor would save the city harmless from damages resulting from acts of the contractor.

The contractor made an application to the court to dismiss the action, contending that the action was one to recover damages resulting from negligence and that the statute of limitations had expired. The court denied the application, holding that the action was based on breach of contract and that the six-year statute of limitations was applicable. The contractor appealed and the determination of the lower court was affirmed.[1]

"The appellate court stated:" The cause of action alleged in the complaint is one for breach of a contractual duty independent of any negligence. Plaintiff (property owner) claims to be a third-party beneficiary to this contract and a sufficient cause of action is stated in the complaint. Wilson v. Oliver Costich Co., Inc., 231 App. Div. 346, 247 N.Y.S. 131; Coley v. Cohen, 289 N.Y. 365, 45 N.E. 2d 913. The six year statute of limitations applies. Blessington v. McCrory Stores Corp., 305 N.Y. 140, 111 N.E. 2d 421, 37 A.L.R. 2d 698."

It appears from the quotation of the opinion, that the contract contained the common provision that the contractor will be responsible for all damage to property irrespective of negligence.

(1) Christoff v. A.E. Petrossi, Inc., 200 N.Y.S. 2d 607, N.Y. Supreme Court, Appellate Division, May 5, 1960.

Contractor Must Allow Owner to Take Possession

A contractor who refuses to give an owner possession of a building because of nonpayment of the balance due for the work is liable to the owner for damages.

That was the holding of an Illinois court in case brought by a contractor to recover the balance he claimed was due on the contract.

The owner interposed a counterclaim for alleged damages due to defective work and for damages resulting from the refusal of the contractor to deliver possession of the building until it was paid the balance due for the work performed.

The court found that the contractor had properly performed the work and granted it judgment for the balance due.

The court also granted the owner judgment for damages sustained by the refusal of the contractor to give the owner possession of the building. The court held that one who comes upon another's property with permission but who exercises such privilege in an unreasonable manner commits a trespass and is subject to liability for any harm.[1]

(1) Pedi v. Jagiencarz, 167 N.E. 2d 447, Appellate Court of Illinois, April 25, 1960.

Decisions of an Engineer Binding Except for Fraud

Evidence of fraud by an engineer nullifies the binding power of his decisions.

"It is a familiar principle that where parties to a building contract agree to be bound by the conclusions or decisions of an arbiter, contracting officer, engineer or architect, the courts will not entertain jurisdiction over disputes arising from such a determination." Corbin on Contracts, Vol. 3, Sec. 652, p. 600; Mundy v. Louisville & N. R. R. Co., 6 Cir., 67 F. 633; Terminal Construction Co. v. Bergen County, Errors & Appeals, 18 N.J. 294, 113 A. 2d 787; Annotation in 54 A. L. R. 1255 and 110 A. L. R. 137; Restatement of the Law, Contracts, Sec. 303.

"It is an equally familiar principle that Courts will entertain jurisdiction of such a dispute when it is alleged that the findings of an arbiter, contracting officer, etc., were based upon fraud and, if fraud is found, then set aside such findings."

"Thus, in 110 A.L.R., at page 143, it is said: 'As stated in an earlier annotation, notwithstanding a contract makes the certificate, report, opinion, or decision of an engineer or architect conclusive on the parties, the law writes into this provision that the conduct of the arbiter must be free from fraud. Fraud on his part destroys the effect of the provision.'"

"See also Wagner Whirler & Derrick Corp. v. U.S., 1954, 121 F. Supp. 664, United States v. Lennox Metal Mfg. Co., 225 F. 2d 302. The law of this state is in accord with this proposition. Crumlish v. Wilmington & Western R. Co., 5 Del. Ch. 270.

"Nor is it necessary, in order for the Courts to set aside such a decision, opinion or finding, that the conduct of the arbiter amount to actual fraud. A finding of constructive fraud is sufficient. Thus, the finding or decision will be set aside if the decision was fraudulent or was induced by such inattention or indifference as to imply bad faith. American Surety Co. v. Kinnear Mfg. Co., 185 Ark. 959, 50 S.W. 2d 586; or the decision was so arbitrary and grossly erroneous as to constitute bad faith. Levering & Garrigues Co. v. United States, 71 Ct. Cl. 739; or, there is proof of constructive fraud or gross mistake as to amount to a palpable and substantial wrong. Edward Edinger Co. v. Willis, 260 Ill. App. 106."[1]

(1) Anthony P. Miller, Inc. v. Wilmington Housing Authority, 179 F. Supp. 199, U.S. District Court of Delaware, November 3, 1959.

Damages for Defective Work

Purchasers of homes in a development are entitled to recover from the contractors who built the homes the cost of installing new heating systems when the ones installed are different from those set forth in the contractors' printed brochure.

That was the ruling of a New York court under the following circumstances:

The purchasers of homes in a development project brought an action against the building contractors arising out of defective installation of radiant heating systems.

The contractors, contrary to representations made in their printed brochures, had substituted substantial amounts of steel in place of copper and brass and had laid the heating tubes under concrete floors and on the ground under the houses instead of within the concrete flooring. Floor leaks developed as a result of the way the work was done and the steel tubing disintegrated.

The contractors refused to make the necessary repairs, and the purchasers of the homes were compelled to install new heating systems.

The court[1] held that the original heating systems as installed were not good for the use intended and that the contractors perpetrated a fraud on the purchasers of the homes. It ruled that the purchasers were entitled to recover: (a), the fair and reasonable value of the repairs made by them in an effort to make the heating system function properly, (b), the fair and reasonable value of installing a new system, and (c), a sum that would compensate them for the inconvenience and discomfort they were caused to suffer while repairs were being made to the system and while the new heating system was being installed.

The purchasers also asked to recover, as an element of damage, the legal expenses incurred in prosecuting the action. The court denied this part of the claim.

It said: "The general rule is that legal expenses incurred for the prosecution or defense of an action are not recoverable as special or general damage. Exceptions to this rule are found in actions for malicious prosecution, false arrest or in those actions where recovery of counsel fees is authorized by statute or contract. The instant action is not within the exceptions and this court is of the opinion that the extension of the right to recover counsel fees would be in contravention of precedent established upon well reasoned rationale. (Citing numerous cases)."

(1) Idyll v. Kohn, 199 N.Y. S. 2d 165, N.Y. Supreme Court, Suffolk County, Feb. 4, 1960.

Damages for Performance Delay

An engineering firm engaged by an owner to supervise construction may be entitled to damages when the contractor does not complete the project within the time limited by the contract.

That was the ruling of the Court of Claims of the State of New York in a recent case[1] in which the firm of Tippetts-Abbett-McCarthy-Stratton asked for and was awarded $81,185.75 in damages from the New York State Thruway Authority.

The Tippetts firm had been engaged by the Authority to provide engineering services for supervision of construction of a portion of the thruway. Its fee for the work was set by the contract at 4% of the final construction costs.

The contractor's original completion date was June 1, 1955. Four extensions were granted by the Authority and the job was not completed until August 30, 1956. The work was accepted September 26, 1956.

Under its contract, the Tippetts firm was required to perform its services until the completion and final acceptance of the contractor's work. It was paid the amount that was due it at the 4% rate.

The firm, however, sought to recover the additional $81,185.75 as damages which, it claimed, resulted from the extensions of the construction contract beyond the stated completion date. The amount of damages was not disputed. The issue was whether the Authority was liable for damages.

The court found that the Authority was the party that had the "real power" to make the contractor perform on time, that it had failed to exercise the power.

"The Thruway Authority unilaterally extended the contract completion date," the court concluded, "yet required claimant to perform supervision services beyond that date. Thus this claimant's contract was breached." **(1) Tippetts-Abbett-McCarthy-Stratton vs. The New York Thruway Authority, Court of Claims of the State of New York, No. 34769, January 23, 1961.**

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quickly, economically with

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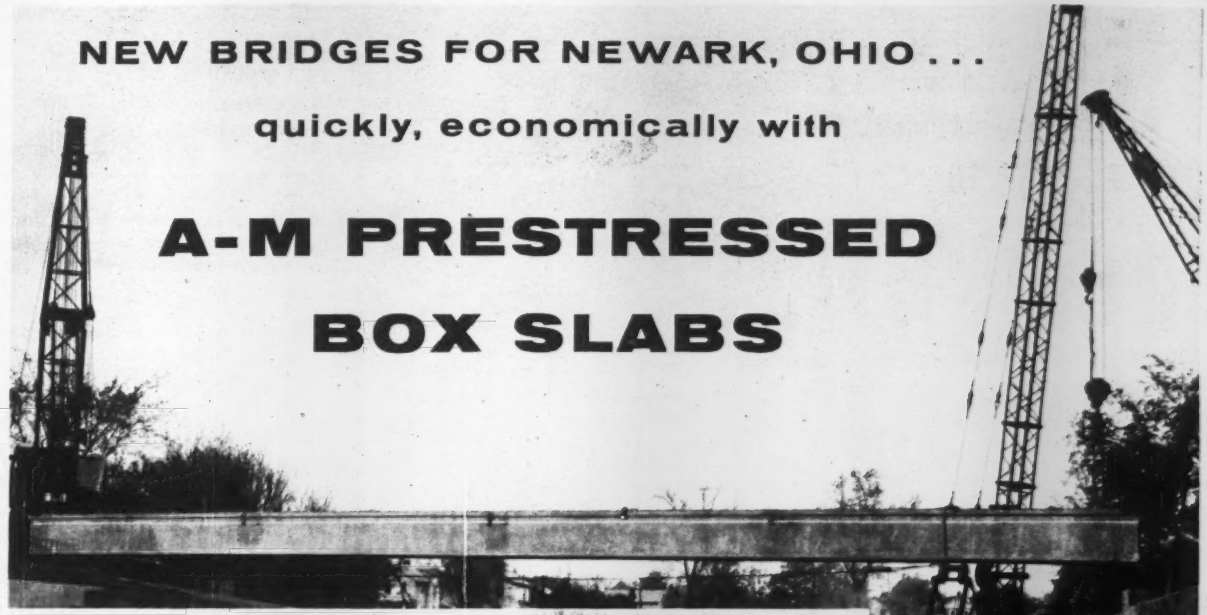

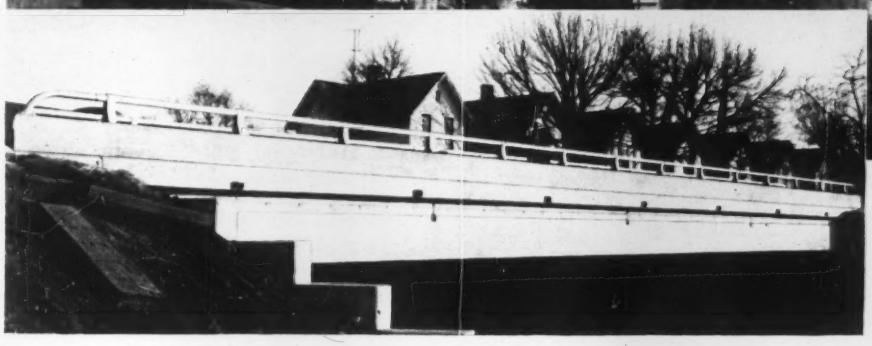

Consultant for both bridges:
Arthur T. Handel & Associates
Newark, Ohio

Contractor:
Wander and Mason, Inc.,
Worthington, Ohio

The 106′ composite box slab being positioned, above, is the first of 16 precast concrete units in the new Eleventh Street Bridge erected for Newark. Each deck member is 48″ deep by 48″ wide, weighs 54 tons, and was pretensioned with straight strand using a bond retardant.

The completed, 112′ Wilson Street Bridge—also erected for Newark—is composed of ten 48″ square composite box slabs. This bridge was constructed in only two days despite extreme weather conditions and a heavy snow.

The prestressed concrete slabs were shipped from American-Marrietta's Columbus, Ohio plant to Newark by rail, transferred to trucks and trailers with two 25-ton hydraulic jacks, and hauled three miles from siding to job site.

Both installations replace steel truss bridges and were constructed in record time with considerable savings of labor and expense.

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If you haven't been using Rooshors, you haven't made maximum profit. Rooshors combine instant adjustability, versatility and safety—all possible because of Rooshors exclusive clamping action load-locks. Rooshors are a 1-man operation. Easy-up, easy-down, easy adjustment to the proper level—all by one man. You reduce the most costly factor of all . . . TIME—with ROOSHORS. Remember, when you figure *all* of your shoring costs, Rooshors cost less. So, why not get the full facts on Rooshors now. Available for lease or purchase from representatives and warehouses near you—coast-to-coast.

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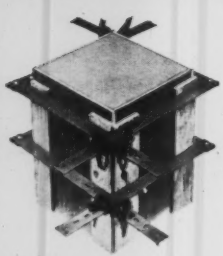
Hold column forms square, with less lumber and less time to fabricate and erect column forms. Available coast-to-coast for purchase or lease.



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They operate in any emergency over a distance of many miles. Can be moved with the job as it progresses or serve permanently. Indoor and outdoor models. Selective ringing, common talking.

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25TH ST. & 3RD AVENUE. BROOKLYN 32. N. Y.

Arbitration Denied

Requirements of local statute held a bar

A contractor may have a right to arbitrate a dispute under the terms of his contract. But local law may impose certain requirements that must be complied with before the right can be exercised.

Failure to comply with local statutory requirements killed a contractor's right to arbitrate in the following case:

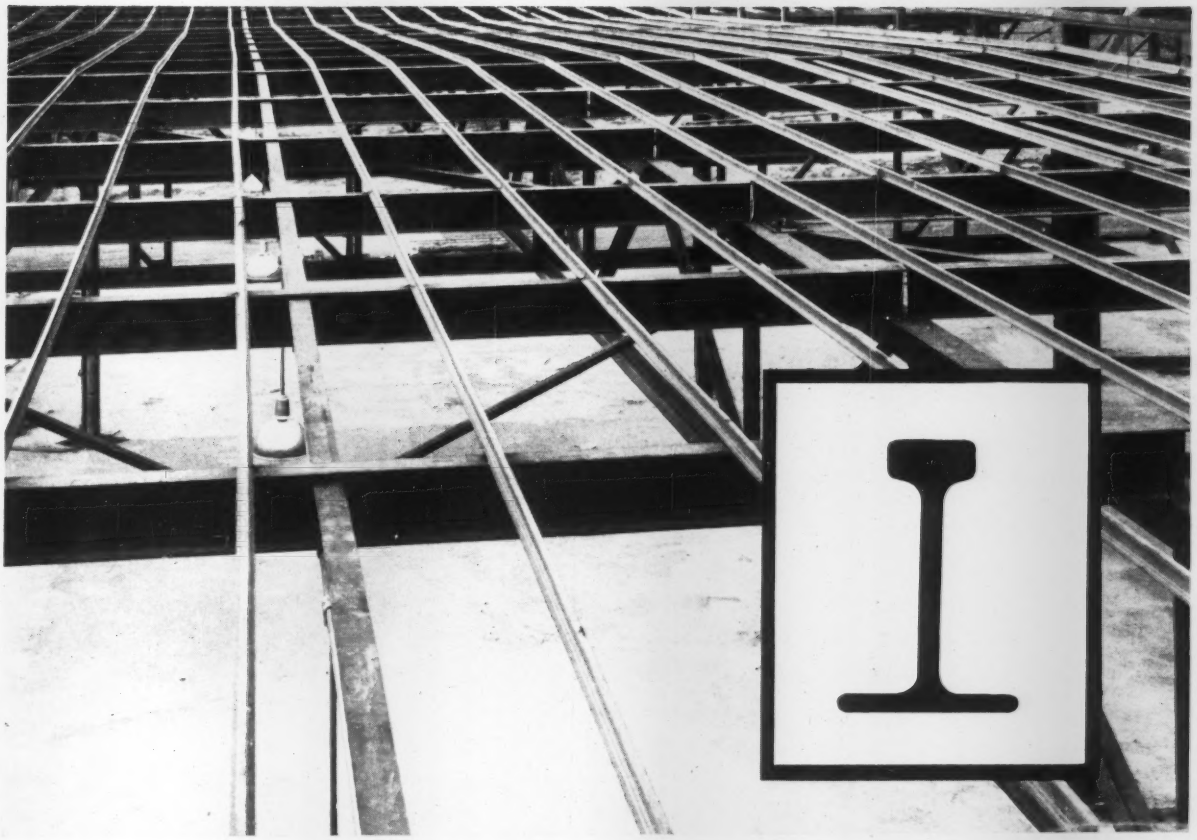
On January 3, 1956, the Board of Education entered into a contract with Heckler Electric Company for the electrical work in a school to be erected at Great Neck, New York. This contract was made "pursuant to the provisions of the Education Law" and was subject to annexed "General Conditions." These "General Conditions" provided that "the Architect shall, within a reasonable time, make decisions on all claims of the Owner or Contractor and on all matters relating to the execution and progress of the work or the interpretation of the Contract Documents" and that arbitration may be had either upon the architect's decision or upon his failure to make a decision within 10 days after the parties have presented their evidence. The "General Conditions" also provided that notice of demand for arbitration had to be made within 10 days after receipt of the architect's decision, or, if the architect failed to make a decision, within a reasonable time after the dispute arose.

Heckler wrote letters both to the Board of Education and to the architects notifying them that he had suffered damages by delays in the work resulting from the Board of Education failing to see to it that the other contractors coordinated their work. No decision having been made by the architects, Heckler made a demand for arbitration.

About two weeks later the Board of Education applied to the court for a stay of the arbitration, contending that Section 3813 of the Education Law provided that no action or special proceeding may be maintained against a school district or board of education unless it shall appear that a written verified claim upon which such action or special proceeding is founded was presented to the district's governing body within three months after the accrual of such claim and that Heckler did not comply with the requirement of that statute.

The court granted the stay.

(1) Board of Education, etc. v. Heckler Electric Co., 199 N.Y.S. 2d 649, N.Y. Court of Appeals, March 31, 1960.



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For complete load span tables and other data refer to Sweets Architectural "A" File No. 2G/Con or request free catalog.

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Gulf® products and service help V. N. Green on 4-million cubic yard excavation job...

The hills around Charleston, W.Va., present no easy task when it comes to building highways. Valleys, steep slopes, meandering creeks, soft shale and plenty of hard rock mean peak performance from equipment is a must.

When V. N. Green and Company, Inc., Charleston, W. Va., started a 2.8-mile stretch of Interstate 77, they planned ahead to assure peak equipment performance. Example: central fuel storage with underground tanks on the job site. These tanks were used to store 12,000 gallons of Gulf Dieselect® fuel and 4,000 gallons of Good Gulf® gasoline.

"With 60 pieces of equipment working 20 hours a day, we averaged 32,000 cubic yards of earth and rock each day," said Harry Staples, Maintenance Superintendent. "You don't worry about fuel until you see what it takes to keep that much equipment going 20 hours a day," he continued. "That's where our underground storage tanks came in handy. And thanks to good Gulf service our fuel supply never even ran low. Furthermore, our gasoline and diesel engines delivered top power and performance."

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H. F. Johnson, right, Project Superintendent, and Ray Kerwood, Gulf Sales Engineer. You get expert, on-the-job engineering service from Gulf.

SP-9996

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Nickel alloy steels provide added strength for cycling 36-ton loads over rough terrain

Pass after pass, the brutal shocks and twisting stresses of earthmoving test the stamina of power-train parts in the International "Payscraper"*. But shocks and stresses meet their match in the nickel alloy steels specified for critical parts.

AISI 4820 nickel alloy steel is used for the most severely stressed components: transmission gears, and integral spiral bevel pinion and shaft. Carburized AISI 4820 steel (3½% nickel) combines high core strength and toughness with case hardness to handle highest tooth loads, resist spalling, and take impact in stride.

Carburizing grade nickel alloy steels of the 4300 series (1.8% nickel) are specified for components that meet all but the most severe loading. For example:

- Transmission shafts
- Spiral bevel ring gear
- Integral axle and sun gear

For these parts, 4300 series steels deliver the needed combination of case and core properties for long life in rugged off-the-road service.

Next time you order or design parts for heavy construction machinery, remember that nickel alloy steels give your equipment added strength and toughness. For engineering data to help you select the best steels for specific applications, write to Inco. We'll be glad to help.

* Registered Trademark, The International Harvester Co.

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NICKEL MAKES STEEL PERFORM BETTER LONGER

Rock tunneling and underpinning required for . . .

New York City Subway Addition

Adding two 2,460-ft express tracks to Manhattan's subway system will require 69,530 cu yd of excavation—most of it through rock tunnel. About 50,000 cu yd will be tunnel excavation in free air, while 15,950 cu yd will be in compressed air. The new section, under 6th Ave. between W. 9th St. and W. 19th St., is for the New York City Transit Authority.

The joint venture of MacLean-Grove & Co., Inc., and Grove, Shepherd, Wilson & Kruge, Inc., New York City, will build the track for $9,777,000. This price includes enclosures for pump room, ventilation chambers, shaft and emergency exits, and underpinning and support of the Hudson & Manhatten RR. The low was 5.8% under the second low, Poirier & McLane Corp., New York City, and 35% under the high of five bidders.

Bidding $40 a unit for 1,030 cu yd of rock excavation in trench, the low was $80 under Poirier & McLane's bid. For 50,000 cu yd of free air tunnel excavation, they were $18 short of the second low with a unit bid of $53, and from $90 to $110 below competitors with a unit bid of $100 for 15,950 cu yd of tunnel excavation, compressed air.

Labor rates include: blacksmiths-drill sharpeners, $3.34/hr; blasters, $4.65; bluestone cutters, $23/day; bricklayers, $4.80; structural ironworkers, $4.60; portable compressor operator, single or 2 in battery—$4.30, 3 or more in battery—$4.55.

The bidding included:

1C MacLean-Grove & Co., Inc., & Grove, Shepherd, Wilson & Kruge, Inc., New York, N. Y. $9,777,000
2 Poirier & McLane Corp., New York, N. Y. 10,339,103
5 Perini Corp., The Arthur A. Johnson Corp., & Peter Kiewit Son's Co., New York, N. Y. 13,202,423
EE N. D. Brodkin, Chief Engineer, Transit Auth. 9,417,305

Bids: 2-3-61 Items	Unit	Quantity	Unit Prices 1 C	2
Exc, earth, in trench	cy	2,650	$40.00	$50.00
rock, in trench	cy	1,030	40.00	120.00
tunnel, free air	cy	50,000	53.00	71.00
compr air	cy	15,950	100.00	100.00
Equip, for compr air work	ls	job	600,000	600,000
Decking	sy	400	40.00	35.00
Timbering, tunnel	Mfbm	230	350.00	350.00
Steel supports	t	320	350.00	350.00
Fill, pipe sew, 15"	lf	50	4.00	5.00
Conc masonry	cy	22,250	80.00	79.00
finished surfaces	sf	6,400	0.50	0.50
Walls, hollow tile or cinder block, 6"	cy	10	76.00	150.00
Masonry, old, removal & disposal	cy	150	70.00	60.00
Drilling, holes in masonry	ea	100	3.00	5.00
DMH, walls plast on conc or hollow tile	sy	65	3.00	4.00
MH, sew, plastering	sy	35	3.00	3.00
Grout	bbl	6,000	16.00	32.00
Steel, beams & shapes, riveted	t	2,160	350.00	450.00
architectural	t	4	2,000	2,000
Cover, emergency exit, counterbalanced	ea	1	2,500	3,000
Reinf bars	t	60	400.00	400.00
Steel doors, w/appurts tp JA	ea	2	350.00	500.00
Steel doors w/appurts tp JB	ea	5	450.00	600.00
Iron, castings, misc	t	0.5	2,500	750.00
Wire mesh, wrapped around beams	lb	200	2.00	1.00
Waterproofing, 1-ply	sy	100	2.00	1.25
3-ply	sy	250	5.00	3.00
4-ply	sy	60	6.00	5.00
dry-ply	sy	9,400	1.00	1.00
Brick in mastic, 1-layer	cy	10	200.00	100.00
Water stops, copper	sf	3,000	4.00	2.00
Ducts, tunnel, VC, 1-way	df*	71,350	0.75	2.00
fibre, 4"	df*	1,700	2.50	5.00
DMH, asb-lumber panels, ¾"	sf	650	15.00	12.00
CIP & ftgs, 3"	lf	375	5.00	7.00
4"	lf	40	7.00	7.50
6"	lf	350	10.00	9.00
8"	lf	2,540	10.00	12.00
12"	lf	90	25.00	20.00
GSP & ftgs, 4"	lf	110	15.00	10.00
Vlvs, back pressure, 4"	ea	1	150.00	100.00
Pipes, discharge, 8"	lf	275	50.00	25.00
sew, vitrified, 12"	lf	20	20.00	15.00
CIP, sew, straight pipe	t	10	400.00	400.00
special castings	t	5	600.00	800.00
Sew, house, to & incl 8"ϕ	lf	6	30.00	15.00
MH lining, vitrified brick or granite block	sy	4	50.00	25.00
Sleeve, galv steel, 24"	ea	1	300.00	40.00
Gratings, in sidewalks	sf	105	8.00	8.00
heavy, for drwy	sf	120	15.00	15.00
Handrails, oak or ash	lf	5,250	2.00	3.00
Asph, street, to restore surface, street, between curb lines	sy	190	12.00	9.00
surface, street, restore within curb lines	sy	170	9.00	10.00
Curb, bluestone, new, 5"	lf	100	5.00	10.00
steel bulb angle	lf	85	6.00	10.00
bluestone, reset	lf	50	4.00	7.00
Pvmt, temporary, roadway	sy	190	6.00	6.00
sidewalk,	sy	170	6.00	5.00
Conc walls & slabs, const & finish upper 3"	sy	20	10.00	6.00
Maintenance & safety exist BMT RR	ls	job	80,000	100,000
exist IND RR	ls	job	500,000	200,000
exist H&M RR	ls	job	1,000,000	500,000
Pipe, steel, new, straight & special	t	10	500.00	400.00
Service conn, for water pipe	ea	3	500.00	500.00
reconstruct	ea	2	500.00	500.00
CIP or steel gas pipe, laying, 20"	lf	130	60.00	15.00
Service conn, for gas pipe in sleeve	ea	3	200.00	250.00
reconstructed	ea	2	300.00	400.00
Pipe, steel by-passing, 4" below street	lf	15	30.00	25.00
upon street w/housing	lf	65	25.00	15.00
without housing	lf	80	20.00	10.00
Conn, perm, gas pipe	ls	job	5,000	7,500
Ducts electric, steel pipe, maintenance, 3"	df*	180	4.00	5.30
4"	df*	100	5.00	7.50
new, 3"	df*	100	5.00	5.30
3½"	df*	25	5.00	7.50
4"	df*	50	7.00	8.70
Sleeves, service conn	ea	3	51.00	15.00
Maintaining bldg, 105 W 13th St	ls	job	25,000	20,000
107 W 13th St	ls	job	25,000	15,000
111 W 13th St	ls	job	25,000	1,000
Tile, str facing, white or colored	sf	2,400	5.00	4.00
Cement, bases	sf	25	2.00	5.00
finish on conc, brick or hollow tile	sf	100	1.50	2.00
finish, floor, 1"	sf	515	1.00	0.75
Finish, floor, 3"	sf	610	1.00	1.00
Stairs, conc, self-support	lf	235	10.00	10.00
supported	lf	190	7.00	5.00
Treads, non-slip met	sf	290	6.00	7.00
Wall strings, cement	lf	50	2.00	3.00
Masonry, brick, common	cf	230	6.00	5.00
Anchors, strap, galv	ea	180	3.00	2.00
Masonry, hollow tile	cf	20	5.00	5.00
Doors, hollow met, tp DH	ea	2	250.00	800.00
Railings, aluminum	lf	36	25.00	30.00
Sign plates, enameled, instal	sf	35	25.00	25.00
Signs, tp D, enameled, instal	sf	20	25.00	25.00
Handrail, aluminum	lf	60	10.00	10.00
Paint, exist surf of passageway betw BMT & IND	ls	job	2,000	500.00
Electrical work	ls	job	5,000	10,000
Drainage equipment work	ls	job	5,000	5,000
Telephone work	ls	job	1,000	1,000

* duct feet

ENR Construction Cost Index (1913=100) 20-cities average—834.27

SAVE UP TO 40% ON NEW SHOVEL PADS

- Extra Heavy Duty
- Superior Quality
- American Made
- Available for Every Model & Make

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Manitowoc	**30"**	**$44.00 ea.**
617—Unit	**20"**	**$21.00 ea.**
820—Lorain	**34"**	**$58.00 ea.**
22B—B.E. Extra Heavy		**$24.50 ea.**

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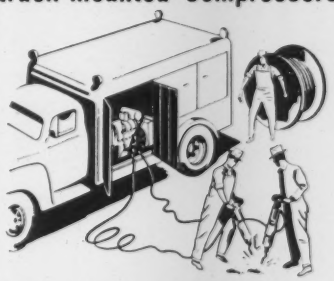
DAVEY

"Auto-Air"

truck-mounted Compressors



The Davey "Auto-Air" is driven direct from the truck engine through a Davey heavy-duty power take-off. It occupies less than one-third of the truck body space, leaving the rest for transportation of men, tools, materials. Available in 85 — 125 — 160 c.f.m. models. Write for Bulletin E-230. A-4028A

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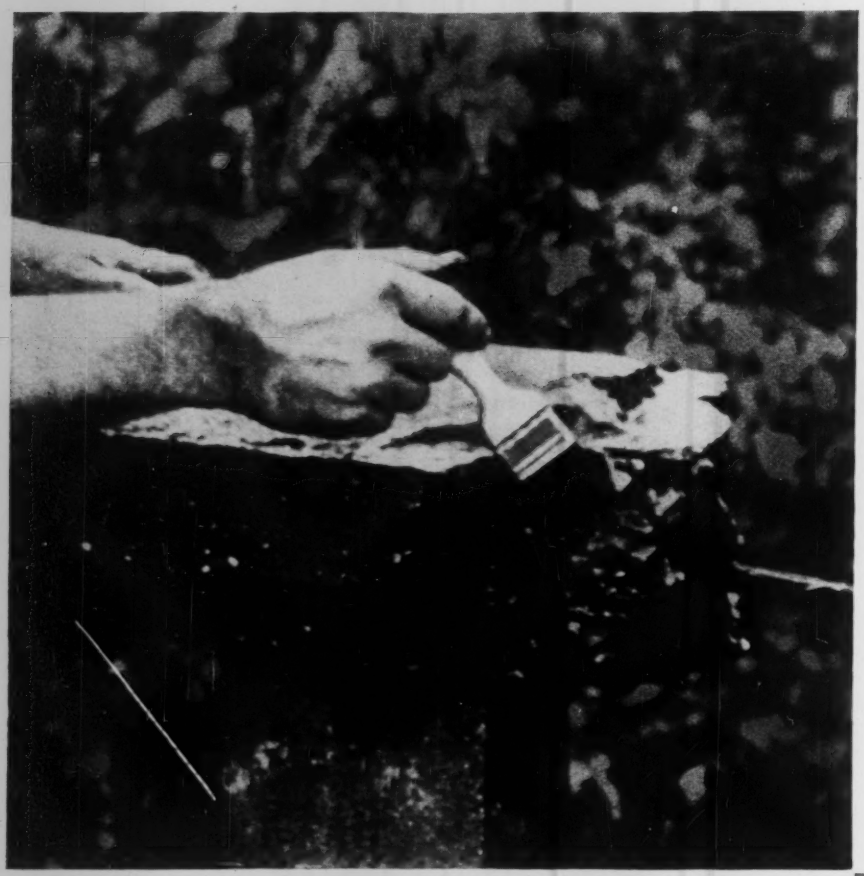
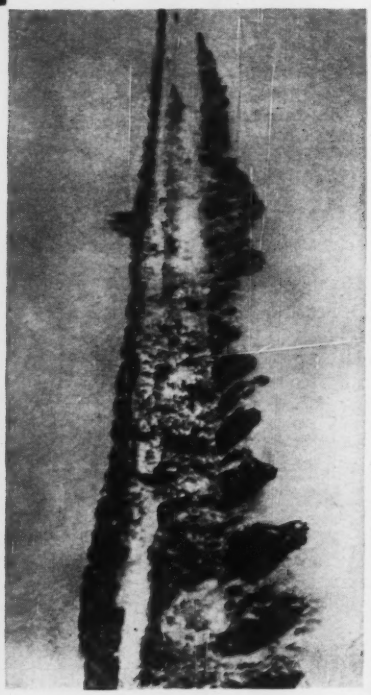


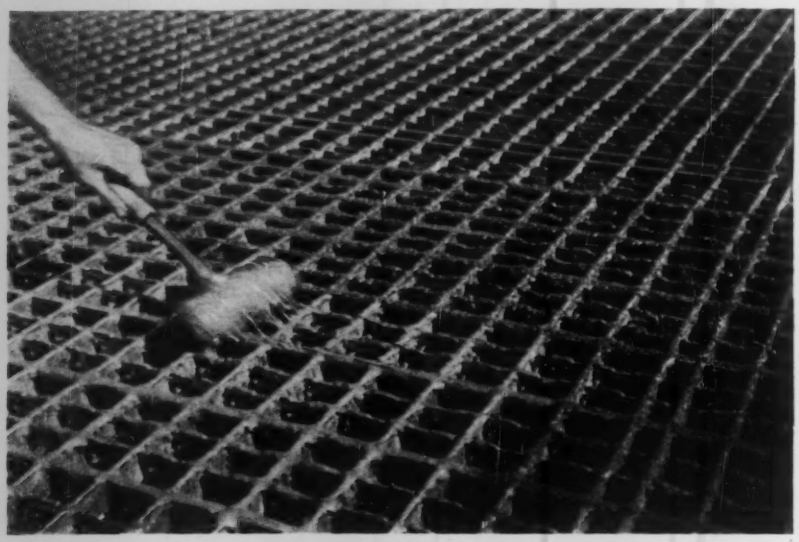
BROKEN ABUTMENTS: Restored stronger than new by brushing on polysulfide-epoxy adhesive to rejoin old concrete, or to bond fresh concrete to old.

EXPANSION PLATES: Polysulfide-epoxy plus aggregate produces skid-proofing, provides smooth, even grading between road and plates, protects metal against rust and corrosion.

SPALLED JOINTS: Repaired in two hours by using polysulfide-epoxy mixed with aggregate as trowelable compound. Reduces tie-up time as much as 48 hours.



SLICK SURFACES: Made skidproof and safe by broadcasting aggregate onto tacky film of polysulfide-epoxy adhesive. Roadway open in 2 to 3 hours.



LITTLE OF BIG REPAIRS

...with concrete adhesive based on THIOKOL liquid polysulfide polymer

Two chemicals in combination, THIOKOL liquid polysulfide polymer and epoxy resin, are providing one of the most useful engineering tools of our time.

Together, they produce a brushable, quick-cure adhesive used to join old or fresh concrete to old... to bond skid-proofing materials to roadways... to seal and protect surfaces against chemical attack and water seepage. The resultant bond is stronger than concrete itself, waterproof, acid resistant, and flexible enough to withstand repeated freeze-thaw cycles.

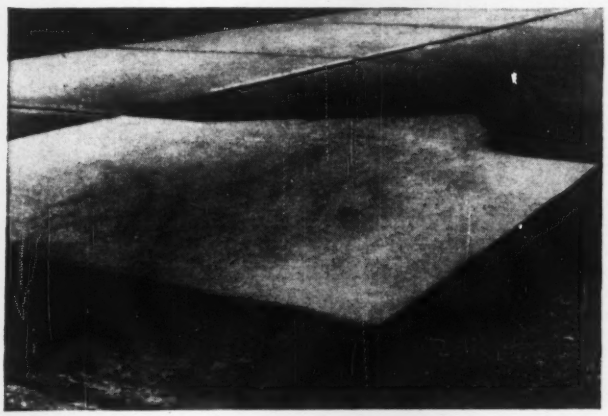
Repairs which heretofore required days of labor and road down-time, the use of heavy equipment and large crews of men are now being completed at a fraction of the cost in time, manpower, material and dollars. Serviceability of such repairs is, by actual experience, proving more satisfactory than those achieved by conventional methods.

Want to know more about this new engineering material? How it's used? Where it's used? The benefits and economies that accrue? Write to Thiokol for brochure CA-200.

POT HOLES: Repaired to featheredge and ready for traffic in as little as three hours when patched with mortar mix of polysulfide-epoxy, sand or aggregate.

HAIRLINE CRACKS: Filled with polysulfide-epoxy. Adhesive film sprayed or brushed over surface seals out water, checks further deterioration.

SCALED AREAS: Repaired in only a few hours with adhesive containing THIOKOL liquid polysulfide polymer. Bonds new concrete to old. Watertight bond stronger than concrete itself.



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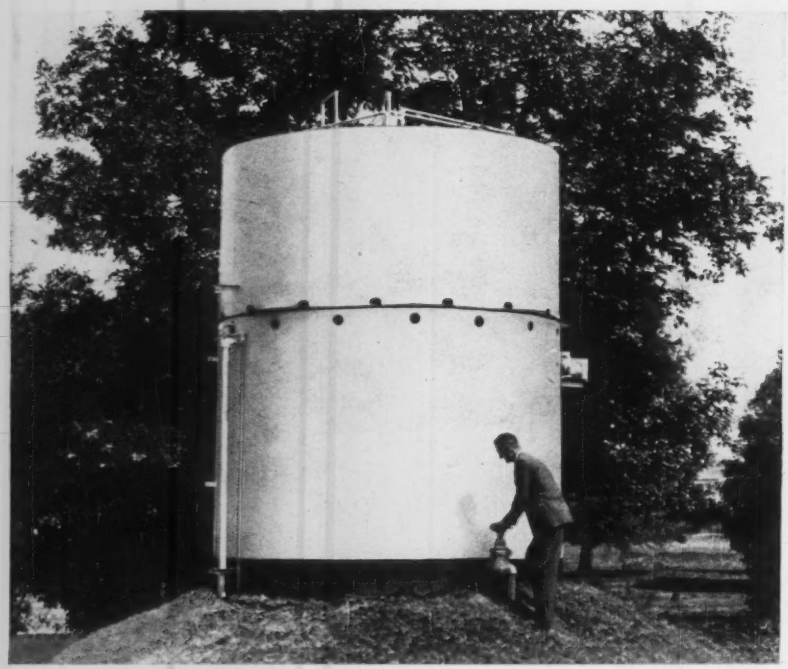
Link-Belt's creative answer to a critical problem:

"Big-city" sewage processing on a small-capacity scale

BIO-PAC

single-unit sewage treatment replaces old-fashioned disposal methods with modern, fully automatic processing



With the population spread proceeding at a rapid pace — with antipollution regulations increasing at a comparable rate — outlying areas face obsolescence of traditional sewage disposal methods.

Housing developments, industrial plants, shopping centers, schools and institutions, motels and trailer courts—all must cope with the problem of updating their methods of sewage disposal. And Link-Belt's practical answer to this problem is Bio-Pac—a modern, compact, bio-filtration sewage treatment system, designed to operate efficiently, and at low cost, in areas remote from metropolitan sewerage service.

Bio-Pac is a result of specialization —40 years of Link-Belt experience, working closely with consulting and municipal engineers, in the design and construction of industrial and metropolitan sewage treatment equipment.

As a result of this specialization, Bio-Pac represents a functional scaling down of large-capacity plant concepts. Single units are available in capacities to handle the sewage needs of 50 to 500 people. And this scaling down is a matter of size alone—no compromise of quality. Every Bio-Pac unit is a complete bio-filtration system . . . built to meet the Ten State Standards for sewage works.

Bio-Pac quality is underlined by design that delivers full two-stage treatment — featuring bio-filtration, the standard process, tested and proven in metropolitan sewage treatment plants. Even under adverse conditions, a consistently stable effluent is produced. And the system readily absorbs the shock loads which frequently upset aeration-type units. Moreover, high performance is accompanied by low operating costs. Because the Bio-Pac process is entirely automatic, it calls for only part-time care (and this by personnel who needn't be highly trained).

FREE FOLDER 2971 tells the story of Bio-Pac in detail. Contact the nearest Link-Belt office for your copy.

The remarkable overall compactness of the Link-Belt Bio-Pac offers a two-way bonus in terms of flexible installation. For example, consider the 11′-6″ diameter unit illustrated above (designed to serve 150 people). As shown, height above ground is just 13 feet. Compact? Of course! But with pit installation, even greater "hide-away" possibilities can be obtained—above-ground height of only 5 feet 7 inches. It all adds up to this welcome fact . . . Bio-Pac can be made to blend with its surroundings as easily as the familiar water storage facilities.

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SANITARY ENGINEERING EQUIPMENT

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Materials Prices

Monthly Market Quotations by ENR Field Reporters

LUMBER, TIMBER, PLYWOOD—*Southern Pine*, bold face, *Douglas Fir*, italic

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
LUMBER, TIMBER																							
1x6s4s	Pine Mbf.	81.00	82.50	86.00	.....	107.00	91.00	96.00	105.50	.....	110.00	101.00	.....	110.00	85.00	96.00b	95.00	88.00	88.00	.....	.....	79.00c	85.00c
	Fir		*85.00*	*99.00*	.....	*100.00*	*92.00*	*104.00*	.....	.....	*98.00*	*101.00*	*76.00*	*106.00*	*84.50*	*103.00*	*102.00*	*100.00*	*103.00*	*82.00*	*80.00*	.....	.....
1x8s4s	Pine "	84.00	85.00	83.00	.....	108.00	93.00	100.00	105.50	.....	112.00	101.00	.....	107.50	87.00	98.00b	97.00	86.00	91.00	.....	.....	81.00c	90.00c
	Fir		*85.00*	*89.00*	*103.00*	*104.00*	*94.00*	*95.00*	.....	.....	*100.00*	*101.00*	*74.00*	*107.50*	*84.50*	*105.00*	*104.00*	*86.00*	*103.00*	*82.00*	*65.00*	.....	.....
2x4s4s	Pine "	81.00	85.00	85.00	95.00b	109.00	98.00	97.00	107.50	.....	106.00	96.00	.....	.....	93.00	99.00b	98.00	86.00	95.00	.....	.....	79.00c	85.00c
	Fir	*110.00*	*102.50*	*108.00*	*110.00*	*110.00*	*110.00*	*111.00*	.....	*103.50*	*109.00*	*101.00*	*87.00*	*106.50*	*104.50*	*106.00*	*105.00*	*116.00*	*106.00*	*90.00*	*73.00*	.....	*100.00*
2x6s4s	Pine "	82.00	85.00	87.00	95.00b	109.00	98.00	97.00	107.50	.....	106.00	101.00	.....	.....	93.00	99.00b	98.00	88.00	93.00	.....	.....	79.00c	84.00c
	Fir	*110.00*	*102.50*	*108.00*	*110.00*	*110.00*	*110.00*	*111.00*	.....	*103.50*	*103.00*	*106.00*	*86.00*	*117.00*	*104.50*	*106.00*	*105.00*	*116.00*	*106.00*	*90.00*	*73.00*	.....	*105.00*
2x8s4s	Pine "	84.00	90.00	92.00	95.00b	116.00	98.00	99.00	122.50	.....	116.00	.....	.....	.....	93.00	100.00b	99.00	92.00	93.00	.....	.....	95.00c	89.00c
	Fir	*110.00*	*105.00*	*107.00*	*110.00*	*111.00*	*110.00*	*111.00*	.....	*104.00*	*112.50*	.....	*87.00*	*105.50*	*116.00*	*107.00*	*106.00*	*116.00*	*108.75*	*90.00*	*73.00*	.....	*111.00*
2x10s4s	Pine "	89.00	95.00	98.00	115.00b	118.00	105.00	104.00	122.50	.....	120.00	111.00	.....	.....	100.00	103.00b	102.00	95.00	103.00	.....	.....	125.00c	89.00c
	Fir	*110.00*	*106.50*	*111.00*	*120.00*	*115.00*	*115.00*	*112.00*	.....	*106.50*	*120.00*	*111.00*	*88.00*	*107.00*	*107.00*	*110.00*	*109.00*	*118.00*	*112.50*	*90.00*	*75.00*	.....	*111.00*
3x12Rgh	Pine "	104.00	110.00	117.00	.....	129.00	112.50	.....	137.50	.....	.....	.....	.....	.....	115.00	115.00	114.00	120.00	120.00	.....	.....	.....	100.00c
	Fir		*120.00*	*126.00*	*140.00*	*125.00*	*145.00*	*127.00*	.....	*124.50*	*183.00*	*131.00*	*91.00*	*132.25*	*122.00*	*122.00*	*121.00*	*134.00*	*131.00*	*97.00*	*87.50*	.....	*122.00*
6x12Rgh	Pine "	114.00	130.00	.....	.....	.....	112.50	.....	171.00	.....	.....	.....	.....	.....	110.00	118.00	117.00	120.00	135.00	.....	.....	.....	.....
	Fir		*130.00*	*131.00*	*150.00*	*126.00*	*145.00*	*127.00*	.....	*124.50*	*183.00*	*176.00*	*91.00*	*123.50*	*122.00*	*125.00*	*124.00*	*134.00*	*131.00*	*115.00*	*91.00*	.....	*122.00*
12x12Rgh	Pine "	129.00	130.00	176.00	.....	151.00	155.00	.....	178.00	.....	.....	.....	.....	.....	120.00	118.00	117.00	120.00	135.00	.....	.....	120.00c	.....
	Fir		*130.00*	*181.00*	*158.00*	*126.00*	*145.00*	*124.00*	.....	*119.50*	*183.00*	*176.00*	*91.00*	*119.50*	*112.25*	*125.00*	*124.00*	*127.00*	*131.00*	*117.00*	*91.00*	.....	*120.00*
FIR PLYWOOD (a)																							
⅜" Int. Plyscored, CD gr.	Msf.	142.00	129.90	136.47	122.00	132.00	132.45	135.00	123.00	110.25	134.45	135.00	101.30	117.00	131.55	128.20	127.50	127.50	129.37	111.00	104.00	.....	158.00
¾" Exterior Plyform, BB gr.	"	185.00	204.40	224.71	212.30	225.00	219.70	220.40	210.00	210.00	224.70	215.00	158.10	207.80	220.00	220.60	219.50	217.75	215.93	93.00	196.00	.....	220.00

Fir-Random length, 75% construction grade, 25% standard grade, 30,000 bf delivered by wholesale dealer, green stock, grademarked. Pine-Random length, #2 common and better, Southern Pine Inspection Bureau grademarked, 30,000 bf delivered by wholesale dealer. •a Certificated stock, carlots, fob city. •b Hemlock, 75% construction grade, 25% standard grade. •c Spruce.

WINDOW GLASS, Discounts from Jobber's list, Feb. 1, 1950 (a) sales tax extra—single or double strength

	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
A quality	78%	74%b	82%c	70+10%eg	70%	72%	72-2-10%	70%	73%-10	72-10-10%	76-10-10%	$12.88.17.32	70-10%	76%d	79%	80%	76%	74-10-10%ef	60%	$8.85/11.55di	40-10-5%a	$6.49 9.50
B quality	80%d	74%b	83%c	70+10%eg	70%	72%	72-2-10%	70%	73%-10	72-10-10%	76-10-10%	$10.45.14.13	70-10%	76%d	79%	80%	76%	74-10-10%ef	73%	6.41/8.07di	40-10-5%a	5.90 8.77

Glass: •a Jobber's list price per box, 14 x 20, ss. $42.75 for A quality, $37.50 for B quality; 14 x 20, ds. $60.00 for A quality, $52.75 for B quality. •b sales tax extra. •c 77% for single strength. •d From 6.15.52 list. •e 77% for double strength. •f Single strength; double strength, 83%. •g From 8.1.58 list. •h ss/ds, 40-in. •i 20 boxes min. •l eff. 10.15.58. •m less 2% disc, 10 days. •n less 1% disc, 10 days. •o add 2% sales tax. •p less 1% for cash. •q less 2% for cash.

EXPLOSIVES per lb, 40% Ammonia Gelatin in 50 lb cases delivered in 500 lb lots (non-seismograph grades)

Urban Areas	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
	$0.2595	$0.2795	$0.2595	$0.2795	$0.2795	$0.2595	$0.2595	$0.2870	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.5130g	$0.2795	$0.2595	$0.2795	$0.2795	$0.2795	$23.20h	.....

Explosives: Cartridges of 1¼" diameter or over, in standard lengths. •g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. •h fob Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60% $24.30 in fiber cases; forcite 40%, $24.05; forcite 60%, $25.60. Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Non-Urban Areas	C L 30,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0.21.95	$0.22.95	$0.26.45	$0.27.95
Group 2†	.22.70	.23.70	.27.20	.28.70

*All areas except those in Group 2 and N.J. cities of Bayonne, Hoboken, Jersey City, No. Bergen, Union City and Weehawken † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucie and south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES prices per linear foot, fob cars, New York

Dimensions	Points	Length	By Rail Pine*§	By Rail Fir	Dimensions	Points	Length	By Rail Pine*§	By Rail Fir
12" at butt	6-in.	30 to 39-ft.	$0.42a	....	14"—2-ft. from butt	6-in.	65 to 69-ft.	1.21	....
12"—2-ft. from butt	6-in.	40 to 44-ft.	.91	....	14"—2-ft. from butt	6-in.	70 to 74-ft.	1.34	$1.40
12"—2-ft. from butt	6-in.	45 to 49-ft.	.97	....	14"—2-ft. from butt	6-in.	75 to 79-ft.	1.41	1.40
12"—2-ft. from butt	6-in.	50 to 54-ft.	1.01	....	14"—2-ft. from butt	5-in.	80 to 84-ft.	1.54	1.45
12"—2-ft. from butt	6-in.	55 to 59-ft.	1.07	....	14"—2-ft. from butt	5-in.	85 to 89-ft.	1.67	1.54

* Pine piling over 90 feet available only in limited quantities. § ASTM Class B •a, trucked in from N. J.
Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid South, over fifty feet on freight from deep south.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	2.85-3.00	4.00a-4.10	3.90	4.75-5.00
New York	Mixed Hardwood	3.45	5.10	4.30	6.50
	Mixed Oak	3.55	5.20	4.40	6.60
Philadelphia	Mixed Oak	3.80	3.97	4.37	4.57
St. Louis	Mixed Oak	2.65	3.40a	3.00h	4.00-4.10ah
San Francisco	Douglas Fir	2.32ef	3.75ef	2.70ef	3.80ca

Tr.—Treated; Untr.—Untreated. •a Creosoted. •c Empty cell. •e Green •f f.o.b. cars. •g 7 x 9 x 8'6" * Add 75¢ tie freight charge to Birmingham. •h 7" x 9" x 8½. •l Mixed Hardwood

CHEMICALS Water, sewage treatment, road work, carlots, f.o.b. works

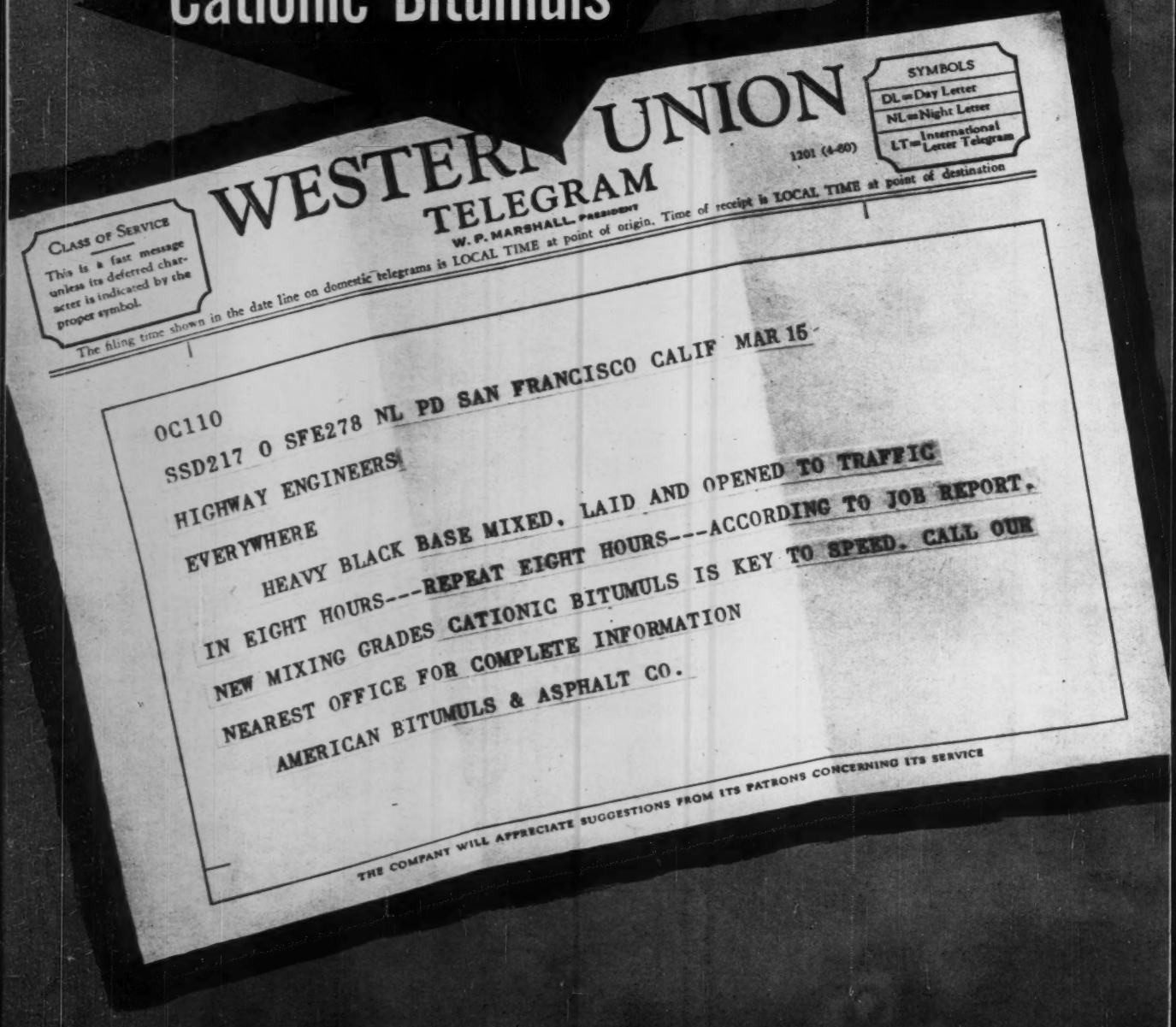
Chlorine cylinders, liquid, per lb. freight allowed, N. Y. State	$ .11	Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, ton	32.00	Sulphate of aluminum, commercial, in 100-lb. bags	2.05
Silicate of soda, 52 deg., in drums, per 100 lb.	2.65	Sulphate of copper in bags, 99% per 100 lb., reg., 25.2% copper content	13.00

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint Roofing; Last, Apr. 27; Next, May 25.
- Wage Rates, Building Board, Lath, Insulation; Last, Apr. 27; Next, June 1.
- Cement Aggregate, Ready-Mixed Concrete; Asphalt; Last, May 4; Next, June 28.
- Iron & Steel Products, Pipe; Last, May 11; Next, June 15.

IT'S NEWS!

The New Mixing Grades Cationic Bitumuls



WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination

0C110
SSD217 0 SFE278 NL PD SAN FRANCISCO CALIF MAR 15
HIGHWAY ENGINEERS
EVERYWHERE
HEAVY BLACK BASE MIXED, LAID AND OPENED TO TRAFFIC
IN EIGHT HOURS---REPEAT EIGHT HOURS---ACCORDING TO JOB REPORT.
NEW MIXING GRADES CATIONIC BITUMULS IS KEY TO SPEED. CALL OUR
NEAREST OFFICE FOR COMPLETE INFORMATION
AMERICAN BITUMULS & ASPHALT CO.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

Daily Construction Journal

NEW MIXING GRADES CATIONIC BITUMULS CUTS HOURS FROM ROAD BASE JOBS

Nationwide Reports Stress Speed of Construction

Base mix cures fast, permits rapid compaction after blading.

Contractor Terms It "Instant Paving"

SAN FRANCISCO, CALIF.—Job reports on base construction using the new Mixing Grades Cationic Bitumuls have now been received here at company headquarters from jobs nationwide.

Initial reaction among engineers and contractors connected with these jobs has been surprisingly uniform: all are impressed with the speed and ease of base construction using this new material. One contractor is reported to have used the term "Instant Paving" when referring to the base mix prepared with the new Mixing Grades Cationic Bitumuls.

This new product, developed by American Bitumuls & Asphalt Company, readily coats a wide range of aggregates—including many that are normallly considered "difficult". The mix is prepared in simple, high-capacity equipment, and can be spread and compacted immediately. There is no delay for aeration.

"BETTER ROADS, FASTER"

Company engineers sum up the advantages of Mixing Grades Cationic Bitumuls in these few words: "Gives you better roads, faster." Every job report to date bears out this brief statement. Such terms as "better adhesion in the presence of water"; "improved early cohesion of the compacted mixes"; "better mixing properties due to fluidity", are frequently used in these reports as reasons for faster, better road construction.

Company Offers Data On New Mixing Grades Cationic Bitumuls

American Bitumuls & Asphalt Co. will welcome inquiries regarding the new Mixing Grades Cationic Bitumuls. Information on this new material is available from the locations shown, right.

Drag Strip Built in Five Working Days

PANAMA CITY, FLA.—The rapid mixing and placement of a sand mix base, stabilized with new Mixing Grades Cationic Bitumuls, was credited with speedy construction of an automotive drag strip near here recently.

The installation, a private project, was started on Wednesday. Preliminary clearing and grading were followed immediately with the mixing operation. Using a travel mixer, windrows of native sand were treated with new Mixing Grade Cationic Bitumuls; the mix was spread, compacted and opened to construction traffic immediately. On Friday, just two days later, this base was given a conventional sand seal and the strip was ready for operation.

Contractors on the job were reported as "impressed" with the ease and speed of the operation; and with the fact that occasional showers during the base mixing operation had no visible effect on the quality of the mix.

Laboratory Wash-Tests Prove Early Set Of New Mixing Grades Cationic Bitumuls

These two photos taken in the laboratory of American Bitumuls & Asphalt Co., demonstrate the "holding power" of the new Mixing Grades Cationic Bitumuls.

In the above photos you see the results of this test: the stone coated with the anionic binder is on the left; that coated with the Cationic binder on the right. Note the complete coverage maintained by the Mixing Grade Cationic Bitumuls.

American Bitumuls & Asphalt Company

320 MARKET ST., SAN FRANCISCO 20, CALIF.
Perth Amboy, N. J.
Baltimore 3, Md.
Cincinnati 38, Ohio
Atlanta 8, Ga.
Mobile, Ala.
St. Louis 17, Mo.
Tucson, Ariz.
Portland 8, Ore.
Oakland 1, Calif.
Inglewood, Calif.
San Juan 23, P. R

BITUMULS® Emulsified Asphalts • CHEVRON® Paving Asphalts • LAYKOLD® Asphalt Specialties • PETROLASTIC® Industrial Asphalts

Cuts Traffic Tie-Up With Quick-Set Mix

EUGENE, ORE.—On a short heavily-traveled section of a major highway outside of Eugene, Oregon, engineers specified construction of a four-lane divided pavement with a minimum of traffic tie-up. They authorized the contractor, Wildish Construction Company, to use the new Mixing Grades Cationic Bitumuls for quick-setting Black Base construction that could be opened to traffic before it was surfaced.

Using a good quality graded aggregate (100% passing ¾"; 5% passing #200 mesh) the contractor prepared the base mix in a central plant using a simple pug mill. Rate of mix production (about 400 tons/hr.) was limited by assigned trucking capacity.

Pug mix direct to truck

The cold-prepared mix was trucked to the job in a fleet of bottom-dumps; bladed to grade; then compacted. It was opened to traffic the following morning while work was continued on the lanes across the dividing strip.

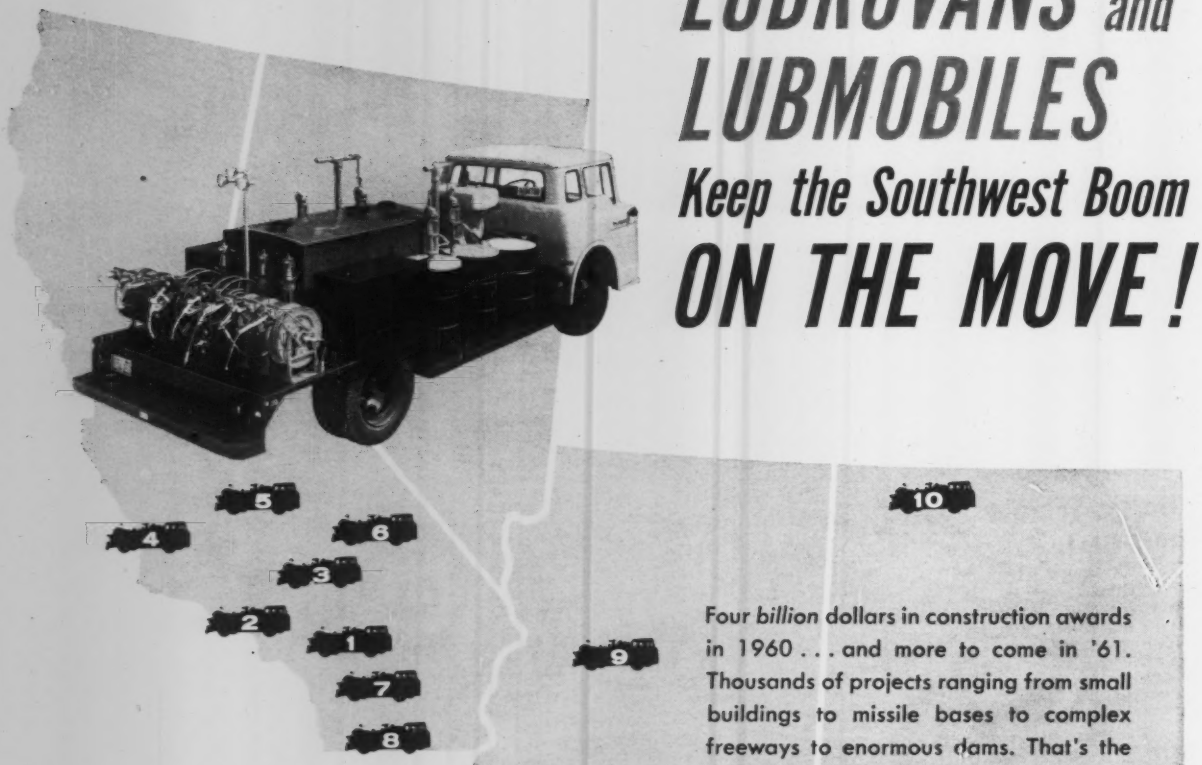
In reporting on the job, the Project Engineer stressed the good workability of the Cationic mix, plus the speed and ease of lay-down.

Cationic Bitumuls Stockpile Mix

Development of the new Mixing Grades Cationic Bitumuls has made possible, in some areas, the production of a patching and maintenance mix that can be prepared in advance; stockpiled until needed. The new Stockpile Mix retains good workability yet sets up readily after placement and compaction under traffic. This mix uses selected graded aggregates. Details are available from Company headquarters.

LINCOLN LUBROVANS and LUBMOBILES

Keep the Southwest Boom ON THE MOVE!



Four *billion* dollars in construction awards in 1960 . . . and more to come in '61. Thousands of projects ranging from small buildings to missile bases to complex freeways to enormous dams. That's the story of the Southwest's incredible construction boom.

Imagine the equipment it takes to keep these projects moving! And remember that this equipment requires attention and maintenance . . . including lubrication.

Many progressive contractors on these big jobs bring lubrication right to the jobsite with Lincoln Lubrovans and Lubmobiles. These portable lube and fuel rigs are custom-assembled from standard components: hose, reels, pumps, compressors, lubricant drums, etc. They can be arranged in any combination from the simplest to the most involved.

Lincoln's equipment catalog and manual illustrate typical rig installations —show you how you yourself can design the rig you need, and even alter it for different construction jobs. Write for this material today. EN-5

Custom-Assembled Portable Lube Rigs Meet the Need of Every Fast-Moving Construction Job

SOME MAJOR CONSTRUCTION JOBS SERVED BY LINCOLN PORTABLE LUBE RIGS

1. Santa Monica Freeway, viaducts
2. Marina del Rey boat harbor
3. Encino Dam enlargement
4. Vandenberg-Arguello missile sites
5. Highway 99, Bakersfield
6. Baker Grade, Las Vegas Highway
7. San Diego Freeway exchange
8. El Cajon Freeway
9. Phoenix Interstate Freeway
10. Navajo Dam

LINCOLN ENGINEERING COMPANY

4010 GOODFELLOW BLVD., ST. LOUIS 20, MO.

DIVISION OF THE McNEIL MACHINE & ENGINEERING CO.

O'8102

Bids Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

BUILDINGS—BA

† **Mass., Watertown**—BA 5/25—U. S. Eng., 424 Trapelo Rd., Waltham, REACTOR RESEARCH LABORATORY, Water Arsenal, ENG-19-016-61-73. $800,000. Plans deposit $10. Jackson & Moreland, Inc., Park Square Bldg., Boston, engr. CD 4/24/61.

Mass., Winchester—BA 6/1—Winchester Hospital, Hospital Admin., 41 Highland Ave., HOSPITAL ADDN., ALTERATIONS. $750,000. James H. Ritchie & Assocs., 135 Clarendon St., Boston, archts. CD 12/29/58.

HEAVY CONSTRUCTION—LB & CA

▲ **Wexler Constr. Co., Inc.**, 118 Needham St., Newton Highlands, Mass., CA **$1,500,000**, FIELD HOUSE, HANOVER, N. H. Dartmouth College, Business Mgr., Hanover, N. H. Campbell & Aldrich, 57 Newbury St., Boston, Mass., archts. CD 5/8/61.

▲ **VERMONT**—State Dpt. Hys., State House, Montpelier, ROADS,

W. H. Hinman, Inc., 58 Main St., Westbrook, Me., CA **$1,709,473**, est. $1,800,000, highway and two bridges, Rte. 89, Contr. 1, Proj. 1-89-3(10), Burlington-Winooski. BA 5/28/61. CD 5/2/61, under LB.

▲† **Perini B. Corp.**, 73 Mt. Wayte Ave., Framingham, Mass., LB Lot A and B, **$2,350,500**, LB Lot A and C **$2,349,260**, FLOOD CONTROL DAM, West End Mad River, CONNECTICUT. U. S. Eng., 424 Trapelo Rd., Waltham, Mass., BA 5/3/61. CD 3/10/61.

BUILDINGS—LB & CA

▲ **John Bowen Co.**, 173 Boston St., Dorchester, Mass., LB **$1,333,000**, P. H. A. Proj. Mass. 33-1, Low-Rent HOUSING PROJ., High, Walnut, Morse and Juniper Sts., BROOKLINE, MASS. Brookline Housing Auth., 226 High St., Brookline, Mass. BA 5/4. CD 4/5/61.

Sawyer Constr. Co., Blanchard Rd., Burlington, Mass., LB **$897,000**, (14 bidders), ELEMENTARY SCHOOL, Hood School Site, Oakwood Ave., LYNN, MASS., City, City Hall, Lynn, Mass. BA 5/1 CD 4/18/61.

Daniel O'Connells Sons, Inc., 480 Hampden St., Holyoke, Mass., CA **$902,640**, est. $900,000. SCHOOL and CONVENT, Meadow Lane School, Newell St., PITTSFIELD, MASS. Sacred Heart Parish, Chancery Office, 63 Elliot St., Springfield, Mass. BA 5/1. CD 5/8/61, under LB.

M. J. Walsh & Sons, Inc., 14 Shawnut Ave., Holyoke, Mass., CA **$871,400**, E-59-3 Contr. 1, CLASSROOM WINGS, State Teachers College, WESTFIELD, MASS. Commonwealth Mass., Dpt. Education, Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. BA 4/14, CD 4/26/61, under LB.

▲ **J. W. Bishop Co.**, 109 Foster St., Worcester, Mass., CA **$1,265,397**, Y.W.C.A. BLDG., 6 Chatham St., WORCESTER, MASS. Young Women's Christian Assoc., 6 Chatham St., Worcester, Mass. BA 4/20. CD 4/25/61, under LB.

Milridge Corp., 16 Pond St., New Haven, Conn., Owner Builds, **$940,000**, 47 HOUSES, Millridge, Cornwall Ave., CHESHIRE, CONN. CD 6/10/60.

▲ **Bonwit Constr. Co., Inc.**, 420 Lexington Ave., New York, N. Y., CA **$1,000,250**, Dundee ELEMENTARY SCHOOL, GREENWICH, CONN. Town, Bd. Educ., Havemeyer Bldg., Greenwich, Conn. (Correction—contractors address). CD 5/8/61.

▲ **Oneglia & Gervasini, Inc.**, Casson Ave., Torrington, Conn., LB **$3,292,000**, (12 bidders), HIGH SCHOOL, TORRINGTON, CONN. Town, Purch. Agt., Town Hall. Torrington, Conn. BA 5/5/61. CD 4/18/61.

▲ **E & F Constr. Co.**, 94 Wells St., Bridgeport, Conn., CA **$5,080,000**, St. Mary's HOSPITAL ADDN., WATERBURY, CONN. St. Mary's Hospital Corp., 56 Franklin St., Waterbury, Conn. BA 4/11/61. CD 4/13/61, under LB.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. Y., Middle Island**—BA 5/25—Central School Dist. No. 12, Brookhaven, Longwood HIGH SCHOOL. $3,200,000. Plans deposit $50. Extended date. Warren H. Ashley, 726 N. Main St., West Hartford, Conn., archt. CD 4/21/61.

▲ **N. J., Asbury Park**—BA 5/31—Housing Auth. City of Asbury Park, Washington Village, 6 story, 60-unit APARTMENT, Comstock Court and 2nd Ave., Proj. No. N. J. 7-6. $1,000,000. Barnett Singer, 549 Broadway, Bayonne, archt. CD 3/17/60.

▲ **N. J., New Brunswick**—BA 6/6—Douglass College of Rutgers University, College Ave., GYMNASIUM for Douglass College. $1,200,000. Plans deposit $50. Kassler & Weisbecker, 18 Nassau St., Princeton, archts. CD 12/13/60.

▲ **N. J., New Brunswick**—BA 6/6—Rutgers University, College Ave., MARRIED STUDENTS HOUSING. $1,000,000. Plans deposit $50. Perry, Shaw, Hepburn & Dean, 955 Park Square Bldg., Boston, Mass., archts. CD 9/25/59, under LB.

▲ **N. Y., New York**—BA 6/7—Dpt. P. Wks., Rm. 1800-L, Municipal Bldg., Zone 7, Contr. 1, structures and equipment; Contr. 2, electrical work; Contr. 3, plumbing work; Contr. 4, heating and ventilating, Hunts Point POLLUTION CONTROL PROJ. EXTENSION, Bronx Boro. Plans deposit $80. CD 2/9/60.

▲ **N. J., New Brunswick**—Rutgers University, Office of President and Treasurer, College Ave., DINING HALL and GRADUATE RESIDENCE HALL, corner College Ave. and Senior St., Proj. NJ-28-CH-21(DS). $3,000,000. Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, Mass., archts. (Correction—no bid date set). Bids in August. CD 5/5/61.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROADS,

N. Y.—Depew Paving Co., Inc., 161 Woodlawn, Depew, N. Y., CA **$1,430,779**, 9 in. cem. conc. pavt. 0.41 mi. 0.45 mi. acc. comp. 1 beam str. 4 spans 279 ft. total Interstate Rte. 506 (Niagara Expressway) Contr. 3, Suspension Br.-Lewiston SH 475, acc. ramp L (relocation of Lewiston Rd.) Rte. 190 and Rte. 18 FINIE 61-1P, FARC 61-33P NIE-61-2P. Proj. I-190-1 (38), U-461 (13), Niagara Co.; CA **$2,217,354** cem. conc. pavt. 1.96 mi. misc. work 0.08 mi. HGS No. 9, 2 comp.-I-beam brs. 1 span 75.1 ft., 1 sp. 75.1 ft. HGS No. 8, rehabilitating bridge In-Creek to Cemetery Rd. Rte. 190 FINIE 61-3, Proj. I-190-1(30), Niagara Co. BA 3/29. CD 3/30/61, under LB.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROAD,

Yonkers Contg. Co., Inc., 969 Midland Ave., Yonkers, N. Y., CA **$3,427,123**, est. $3,953,000, 9 in. cem. conc. pavt. 3.57 (3.28 acc.) 2 HGS comp.; WF beam brs. 3 spans 159 ft. total, 3 spans 213 ft. total Interstate Rte. 402 (Gurney Lane to Luzerne Rd.) Rte. 87. FISH 61-3, Proj. I-87-3(37), Warren Co. BA 3/29, CA 5/5. CD 3/30/61, under LB.

George W. Rogers Constr. Corp., 6 Church St., New York 6, N. Y., CA **$766,350**, Contr. 3180 BULKHEAD WALL from south side of 29 Street Pier to north side of 35 Street Pier, Brooklyn Boro, BROOKLYN, N. Y. Comr. Marine & Aviation, Rm. 304, Battery Maritime Bldg., foot of Whitehall St. (South Ferry), New York 4, N. Y. BA 4/20, CA 5/8. CD 4/24/61, under LB.

▲ **Sicilian Asphalt Paving Co.**, 130 William St., New York 38, N. Y., LB **$1,330,800**, (15 bidders), Contr. NYA-120.013, FDNS. and PIPING for eight Fuel Tanks Nos. 53 to 60, New York International Airport, IDLEWILD, N. Y. Port of New York Auth., Rm. 1100, 111 Eighth Ave., New York 11, N. Y. BA 5/4. CD 4/7/61.

Del Balso Constr. Corp. & Rusciano Constr. Corp., 2 Penn Pl., Pelham Manor, N. Y., LB **$993,530**, (8 bidders), OUTFALL STORM SEWER, New York State Hospital Bronx Boro, NEW YORK, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y. BA 5/3. CD 4/28/61.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 5/4, ROAD,

Public Constructors, Inc., P. O. Box 34, Blackwood, N. J., LB **$3,959,672**, (7 bidders), constr. 3 mi. Interstate Rte. 287 (the Middlesex Freeway) from Stelton Rd., South Plainfield to New Durham Rd., Edison Twp. incl. six bridges and completion of interchange at Stelton Rd., Middlesex Co. CD 4/6/61.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROADS,

New Enterprise Stone & Lime Co., Inc., New Enterprise, Pa., CA **$1,685,153**, 19,466 ft. divided hy., one 24 ft. lane rein.-con., 1 24 ft. lane overlay cr. agg. and bit. surf., 3 bridges, Interstate T, R. 126, Fulton Co.; CA **$101,132**, 14,000 ft. cr. agg. base with bit. surf. 18 ft. wide and bridge with an alternate superstructure, L. R. 05094(2), Bedford Co., BA 4/7/61. CD 4/12/61, under LB.

MARYLAND—State Rds. Comn., 300 W. Preston St., Baltimore Zone 3, Bids opened 5/2, ROAD,

Geo. F. Hazelwood Co., Cumberland, Md., LB **$812,656**, (5 bidders), grading, drainage, surf. 2.287 mi. relocated US 40, Sideling Hill Creek to Town Hill, Contr. A-464-18-620, Allegany Co. CD 4/12/61.

▲† **U. S. Eng.**, 24 St. and Maryland Ave., Baltimore 18, Md., cancelled bids to have been opened May 18, DREDGING Baltimore Harbor and channels, Baltimore, CIVENG 18-020-61-15, MARYLAND. **$4,500,000-$5,000,000.** CD 5/2/61.

BUILDINGS—LB & CA

▲ **McManus, Long, Brockwehl, Inc.**, 65 Arcadia Court, Albany, N. Y., LB **$1,408,700**, (10 bidders) general contract BUILDING No. 22, State Office Bldg. Campus Site, Emergency Seat of Government, ALBANY, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y., BA 5/3;

Joseph Davis, Inc., 120 W. Tupper St., Buffalo, N. Y., LB **$543,322**, (6 bidders), HEATING, BLDG. No. 22 (Albany, N. Y.);

Nager Elec. Co., Inc., 426 Broadway, Brooklyn, N. Y., LB **$735,000**, (7 bidders), ELECTRIC, Bldg. No. 22 (Albany, N. Y.).

Migliore Constr. Co., 949 Englewood Ave., Tonawanda, N. Y., LB **$792,249**, (15 bidders) general contract Wallenberg ELEMENTARY SCHOOL, CLARENCE, N. Y. Town, Central School Dist. No. 1, School Bd., 9625 Main St., Clarence, N. Y. BA 5/1. CD 4/11/61.

Milau Assocs., Inc., 310 Northern Blvd., Great Neck, N. Y., CA Est. **$800,000**, 1 story, 55,000 sq. ft. PLANT ADDN. U. S. Printing and Lithography Bldg., 110 Old Country Rd., MINEOLA, N. Y. Diamond National Corp., 122 E. 42 St., New York 17, N. Y. Hills & Medcalfe, 601 Madison Ave., New York 22, N. Y., archts.

▲ **Stanley R. Broff**, 120 Central Park S., New York 19, N. Y., CA est. **$1,750,000**, 14 story, 155 unit, 100x125 ft. APARTMENT, 328-336 E. 75 St. southwest corner 1st Ave., NEW YORK, N. Y. Broff-Tenney, Inc., 400 Madison Ave., New York 17, N. Y. H. I. Feldman, 415 Lexington Ave., New York 17, N. Y., archt. CD 4/10/61.

▲ **Dworman Assocs.**, 400 Park Ave., New York 22, N. Y., Owner Builds, Est. **$3,000,000**, 12 story APARTMENT and OFFICES, incl. penthouse, 55 W. 55 St. between 3 and 6 Aves., NEW YORK, N. Y. Resnick & Green, 654 Madison Ave., New York 21, N. Y., archts. CD 12/13/60.

▲ **H. Sand & Co., Inc.**, 11 Park Pl., New York 7, N. Y., LB **$903,600**, (4 bidders), HEATING LIBRARY, PHYSICS BLDG., BIOLOGY BLDG., State University College on Long Island, STONY BROOK, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y. BA 5/3, CD 4/25/61;

Horowitz Bros., Inc., Robins Lane, Syosset, N. Y., LB **$514,000**, (2 bidders), SANITARY WORK Library, Physics Bldg., Biology Bldg., State University College on Long Island (Stony Brook, N. Y.);

Pansco Elec. Constr. Co., Inc., 820 Elmont Rd., Elmont, N. Y., LB **$711,000**, (6 bidders), ELECTRIC WORK, Library, Physics Bldg., Biology Bldg., State University College on Long Island (Stony Brook, N. Y.).

▲ **Paul Schmergel**, 1616 Northern Blvd., Manhasset, N. Y., CA Est. **$1,200,000**, 2 story, 72 semi-circular Westhampton House COOPERATIVE APARTMENT, incl. swimming pool, WESTHAMPTON BEACH, N. Y. Syndicate, c/o Victor De Nigris, archt., 1616 Northern Blvd., Manhasset, N. Y. CD 1/3/61.

▲ **Richland Agency, Inc.**, 18 W. 55th St., New York, N. Y., Owner Builds, **$2,000,000**, GOLF CLUB, incl. 18 hole golf course, motel, swimming club, Rte. 527, Manalapan Twp., FREEHOLD, N. J. James Gilmore Harrison, 266 Harrison Rd., Turtle Creek, Pa., archt. for Golf Course. (Correction—owner's address). CD 4/19/61.

(Continued on page 172)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; Industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**West of Mississippi**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

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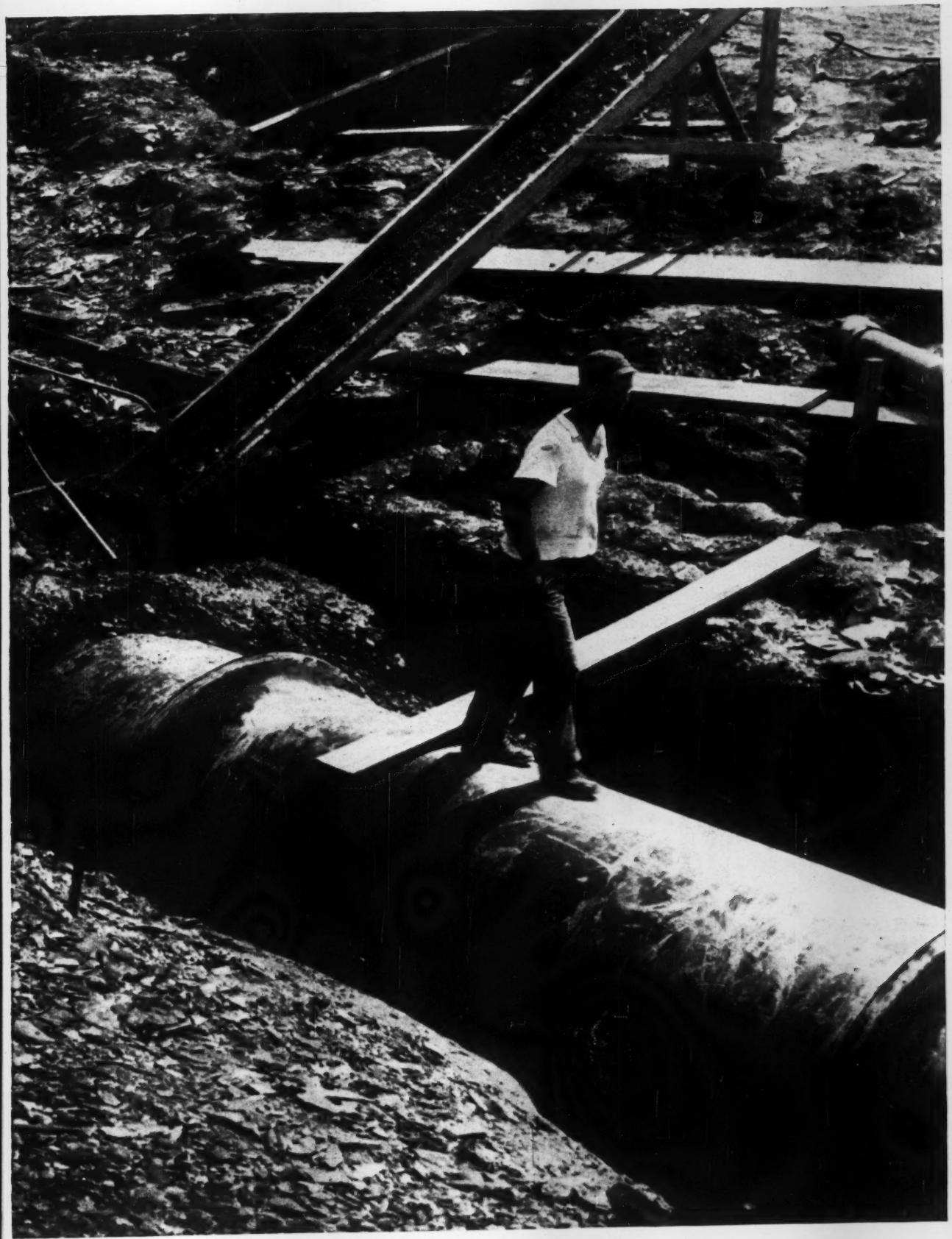

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(Continued from page 169)

▲ **B. J. Builders, Inc.**, Hy. 36, Long Branch, N. J., CA $1,545,150, SCHOOL 40, Gates, Garfield and Ocean Aves., JERSEY CITY, N. J. City, City Hall, Jersey City, N. J. CD 3/12/59.

▲ **United Engineers & Constructors, Inc.**, 1401 Arch St., Phila., Pa., CA Est. $84,000,000, ELECTRIC GENERATING STATION, Hackensack River north of Marion Station, JERSEY CITY, N. J. Public Service Electric & Gas Co., 80 Park Pl., Newark, N. J. CD 12/29/60.

▲ **Ridgecrest Gardens Constr. Co.**, c/o A. E. Williamson, owner, 484 State Hy. 17, Paramus, N. J., CA Est. $1,000,000, 40 HOUSES, off Franklin Ave., OAKLAND, N. J. H. Cordes, 1958 State Hy. 23, Wayne, N. J., archt. John Oldenburg of Bergen-Passaic Engineering, Inc., 367 Ramapo Valley Rd., Oakland, N. J., engr. CD 3/13/61.

Builders Fair, Inc., 1 Hudson St., Union, N. J., Owner Builds, $750,000, 20 HOUSES, Summit Rd., SPRINGFIELD, N. J. Wm. Chirgotis, 80 Morris Ave., Springfield, N. J., archt.

Fred Brotherton, 185 Atlantic St., Hackensack, N. J., LB $975,000, general contract MUNICIPAL BLDG., TENAFLY, N. J. Borough, Municipal Bldg., Tenefly, N. J. Litwack & Shteir, 9 Clinton St., Newark, N. J., archts. BA 5/3/61. CD 4/12/61.

▲ **Gamble & Gamble Constr. Co.**, P.O. Box 57, Bolivar, Pa., LB $1,438,452 (11 bidders), general contract SECONDARY HIGH SCHOOL for DuBois Area Jt. School Dist., DuBOIS, PA. Pa. State Public School Bldg. Authority, 101 S. 25th St., Harrisburg, Pa. BA 5/4/61. CD 4/5/61.

Builders & Developers, Inc., 515 Wyeth St., Alexandria, Va., Owner Builds, $700,000, brick, block STORES, Baltimore National Pike west of Rolling Rd., west of here, BALTIMORE, MD. Bacharach & Bacharach, 1606 Kelley Ave., Baltimore 9, Md., archts.

▲ **W. H. Ward Contrs.**, P.O. Box 235, Glen Burnie, Md., LB $1,147,500 (7 bidders), 2 story, brick, concrete, steel, block 28-classroom Gilmor ELEMENTARY SCHOOL, BALTIMORE, MD. City, Bureau Bldg. Constr., 410 Municipal Bldg., Baltimore 2, Md. BA 5/3. CD 4/21/61.

▲ **San Joe Constr. Co.**, 1836 Harford Rd., Baltimore 13, Md., LB $1,113,000 (9 bidders), 2 story, brick, concrete, steel trusses, built-up roofing Calvert Co. HIGH SCHOOL, PRINCE FREDERICK, MD. Bd. Educ. Calvert Co., Prince Frederick, Md. Rogers, Taliafero & Lamb, 411 N. Charles St., Baltimore 1, Md., archts.

▲ **Victor R. Beauchamp**, 431 Cedar St. N. W., Wash., D. C., CA $1,826,411, Men's DORMITORY F, WASH., D. C. American University, Massachusetts and Nebraska Aves. N. W., Wash., D. C. BA 4/18/61. CD 4/21/61, under LB.

▲ **Donohoe Constr. Co.**, 314 Pennsylvania Ave. S.E., Wash., D. C., CA Est. $4,000,000, 10 story, Air Terminal HOTEL, 12th and K Sts. N.W., WASH., D. C. Airport Transports, Inc., 15th and L Sts. N.W., Wash., D. C. Leo Kornblath Associates, 256 E. 49th St., New York 17, N. Y., and Wendell B. Hallett, 200 3rd St. S.E., Wash., D. C., archts.

SOUTH

HEAVY CONSTRUCTION—BA

Fla., Marathon—BA 6/1—Fishermens Hospital Assn., c/o Smith & Korach, archts., 721 NW 21st Court, Miami, 1 story 36-bed Fishermen's HOSPITAL. $700,000. G. J. Spolter, 1205 Lincoln Rd., Miami Beach, struct. engr. Oliver Parsons Constr. Engineers, Inc., 719 NW 21st St., Miami, mech. engrs. CD 6/23/60.

N. C., Laurinburg—BA 6/1—Laurinburg Housing Auth., Laurinburg, 73 low rent HOUSING UNITS. $750,000. Plans deposit $50. W. E. Matthews Co., Railroad Bldg., archt. CD 4/22/60.

▲† **Fla., Miami**—BA 6/15—Federal Aviation Agency, P. O. Box 1689, Fort Worth, Tex., AIR ROUTE TRAFFIC CONTROL, $1,750,000. Extended date, CD 4/5/61.

BUILDINGS—BA

▲ **Ala., Gadsden**—BA 5/25—Baptist Memorial Hospital, 1137 7th Ave., 150 bed HOSPITAL, $2,400,000. Extended date, Charles H. McCauley, 1917 5th Ave. S. Birmingham, archt. CD 4/20/61.

▲ **S. C., Columbia**—BA 6/8—Providence Hospital, 2435 Forest Dr., HOSPITAL ADDN. $1,000,000. Plans deposit $50. LaFaye, Fair, LaFaye & Associates, 1226 Sumter St., archts. CD 2/23/61.

▲† **Va., Quantico**—BA 6/21—Area P. Wks. Office, Chesapeake, U. S. Naval Weapons Plant, Wash., D. C., REHABILITATION Wherry HOUSING, Marine Corps Schools, NBy 30727. Over $1,000,000. Extended date. CD 4/12/61.

BUILDINGS—SLC

▲ **Fla., Fort Lauderdale**—Gerald & Seymour J. Markoe, Box 398, Kendal 56, soon lets contract 15 story 100 unit Sunrise Tower APARTMENTS, Sunrise Blvd. $1,000,000. Polevitsky, Johnson & Assoc., 250 NE 18th St., Miami, archts.

▲ **Fla., Miami**—Flagler Federal Savings & Loan Assocs. of Miami, 100 N. E. 2 Ave., soon lets contract BANK and OFFICE, N. E. corner of N. E. 1st St. and N. E. 1st Ave. $1,100,000. Alfred B. Parker, 2921 S. W. 27th Ave., archt. N. J. Dignaum & Assocs., 260 Palermo Ave., Coral Gables, engrs. CD 5/5/61.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Dpt. Hys., 1221 East Broad, Richmond, ROADS,

Va.—**Ballenger Paving Co.**, P. O. Box 2285, Greenville, S. C., CA $1,459,876, Contr. II, grading, drainage, paving from N. C. State line to 3.79 mi. Int. Rte. 58 on Rte. 95, Proj. 0095-040-033, P401, Greenville Co.;

Va.—**Dickerson Inc.**, P. O. Box 448, Monroe, N. C., CA $939,131, Contr. I, grading, drainage, paving from Carolina County line to 0.5 mi. north Rte. 1 on Rte. 95, Proj. 0095-088-101, Spotsylvania Co.;

Va.—**E. E. Lyons Constr. Co.**, Tyson's Corner, Vienna, Va., CA $838,195, grading, drainage, paving 2.67 mi. on McLean By-pass on Rte. 123, Proj. 0123-029-012, C501, C504, Fairfax Co.;

Va.—**Shoosmith Bros., Inc.**, Lewis Rd., Chester, Va., CA $529,670, Contr. II, grading, drainage, paving from Carolina County line to 0.5 mi. north Rte. 1 on Rte. 95, Proj. 0095-088-101, Spotsylvania Co. Grand total $3,764,872. BA 4/26/61. CD 5/1/61 under LB.

▲ **WEST VIRGINIA**—State Rd. Comn., Charleston, Zone 5, BRIDGE,

Allied Structural Steel Co. & Midland Structural Steel Co., 20 North Wacker Drive, Chicago 6, Ill., CA $2,130,000, steel superstructure, Kanawha River Bridge No. 2134, over Kanawha River, Interstate 64, near Nitro, Proj. I 64-1(50)43, Putnam Co. Michael Baker, Jr., Inc., 19 Dunbar Ave., Dunbar, consult. engr. BA 4/18/61 CD 4/21/61, under LB.

FLORIDA—State Road Dpt., Tallahassee, ROADS,

Cone Bros. Contr. Co., Box 1259, Tampa, Fla., CA $874,266, construction to provide divided 4-lane facility, incl. grading, limerock base, type 1 b. conc. surf. course, binder course, three concrete box culverts bridge lengths, storm sewers, approx. 6.403 mi. between SR 674 Ruskin and point 6.4 mi. northeast, Federal Aid Project No. F-011-2(46) (Job No. 10060-3211) AR 45, Hillsborough Co. BA 3/28/61, CA 5/5/61. CD 3/31/61.

FLORIDA—State Road Dpt., Tallahassee, ROADS,

Sam Davis Constr. Co., Box 1256, Dunedin, Fla., CA $792,917, constructing divided 4-lane facility incl. grading, limerock base Type I b. conc. surf. binder course, sections Type b. conc. surf. course with b. conc. leveling course, resurf. approx. 7.306 mi. between north city limits Cocoa and Delespine, Federal Aid Project No. F-003-5(11) (Job No. 70020-3177), SR 5(US 1), Brevard Co. BA 2/23/61, CA 4/26/61. CD 2/28/61, under LB.

LOUISIANA—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, ROAD,

Louisiana Paving Co., Drawer 8, Kenner, La., CA $2,286,008, c. conc. pavt., grade separation structures 5.615 mi. Calhoun-West Monroe Hy., Rte. I-20, SP No 451-06-11, FAP No. I-20-3(16)103, Oachita Parish. BA 3/22. CD 3/27/61, under LB.

▲ **KENTUCKY**—Commonweauth of Ky., Dpt. Hys., Frankfort, ROADS,

Ky.—**Oman Constr. Co.**, Box 146, Nashville, Tenn., CA $1,286,478, grade, incid. surf. 2.323 mi. Louisville-Lexington, Proj. I-64-4(7)65, Franklin Co.;

Ky.—**DeSalvo Constr. Co.**, 3701 Red Bank, Cincinnati, O., CA $1,669,652, c. conc. pavt. 2.785 mi. Covington-Lexington, I 75-8(7)185, Kenton Co.;

Ky.—**Wood & Bush Co.**, 418 Ann St., Frankfort, Ky., CA $1,450,837, grade, incid. surf. 3.82 mi. Pineville-Harlan, F 151(11), Bell Co.;

Ky.—**S. J. Groves & Son Co.**, 500 Wesley Temple Bldg., Minneapolis, Minn., CA $1,396,151, grade, incid. surf. 5.369 mi. East Ky. Turnpike, EK 1-3, Clark and Powell Counties;

Ky.—**Talbott Constr. Co.**, 30 Wall St., Winchester, Ky., CA $1,879,469, grade, incid. surf. 5.497 mi. East Ky. Turnpike, EK 1-5, Powell Co. Grand total $7,683,628. BA 4/28. CA 5/4. CD 5/2/61, under LB.

▲ **J. H. Jenkins, Inc.**, Box 1282, Baton Rouge, La., CA $1,115,429, SANITARY TRUNK SEWERS, Essen Lane along N. Branch Ward Creek, BATON ROUGE, LA City, Municipal Bldg., Baton Rouge, La. CD 3/29/61, under LB.

BUILDINGS—LB & CA

▲ **Liberty Constr. Co.**, 1020 E. Wendover Ave., Greensboro, N. C., Owner Builds, $1,500,000, 130 RESIDENCES, Tiffany Terrace subdivision, CHARLOTTE, N. C.

▲ **King-Hunter, Inc.**, 1421 Westover Terrace, Greensboro, N. C., LB $1,319,627, general contract HOSPITAL, NEW BERN, N. C. Bd. Comrs. Craven Co., Courthouse, New Bern, N. C. BA 4/28/61. CD 3/28/61.

▲ **D. H. Foster, Paul J. Kortsh & Jack Williams**, 3836 Central Ave., St. Petersburg, Fla., LB $2,088,777 (14 bidders), 250 units HOUSING, Fla. 41-1 and 41-2, FORT PIERCE, FLA. Fort Pierce Housing Auth., 435 N. 7th St., Fort Pierce, Fla. BA 5/3/61. CD 4/24/61.

Newton-Rushton Co., P.O. Box 191, Vidalia, Ga., LB $844,579, Proj. Ky.-11-3, HOUSING PROJ., HOPKINSVILLE, KY. City Municipal Housing Comn., Admin. Bldg., Hopkinsville, Ky. BA 5/3. CD 4/28/61.

▲ **M. J. O'Brien & Co.**, 283 Scott St., Memphis, Tenn., CA $1,189,811, 69,953 sq. ft. ACADEMIC CLASSROOM, Murray State College, MURRAY, KY. Commonwealth of Ky., Div. Purchases, Frankfort, Ky. CD 3/29/61, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

O., Mansfield—BA 5/23—City, City Hall, West Park SEWERS. $870,000. Plans deposit $50. Extended

date.: Madison Engineering Assocs., 45 W. 2nd St., engrs. CD 5/4/61.

O., Cleveland—BA 6/8—Comrs. Cuyahoga Co., County Admin. Bldg., 1219 Ontario, Zone 13, PAVING, IMPROVING W. 130th St. from Bagley to Pearl Rd. $801,500. Plans deposit $25. CD 1/14/60.

BUILDINGS—BA

▲ **Ill., Chicago**—BA 5/25—Illinois Institute of Technology, 3300 S. Federal St., John Crerar LIBRARY. $1,800,000. Skidmore, Owings & Merrill, 30 W. Monroe St., Zone 3, archts. CD 2/8/60.

▲ **O., Elgin**—BA 5/26—Bd. Educ., HIGH SCHOOL, $1,300,000. Plans deposit $50. CD 11/17/60.

O., Wickliffe—BA 6/1—Bd. Educ., 2221 Rockefeller Rd., JUNIOR HIGH SCHOOL ADDN., ALTERATIONS. $950,000. Plans deposit $50. Joseph A. Regner & Assocs., 15900 Chagrin Blvd., Cleveland, Zone 20, archts. CD 11/14/60.

▲ **Ill., Chicago**—BA 6/13—St. Joseph's Hospital, 2100 Burling St., 12 story HOSPITAL, 2900 Lake Shore Dr. $10,000,000. Belli & Belli, 6040 West Fullerton Ave., archts. CD 9/17/59.

† **Ill., Rock Island**—BA About 6/13—U. S. Eng., 536 South Clark St., Chicago, Zone 5, REHABILITATION of POWER DISTRIBUTION, Rock Island Arsenal, ENG-11-032-61-77. Approx. $800,000. Plans deposit $10. CD 9/1/60.

▲ **O., Oberlin**—BA 7/10—Oberlin College, Oberlin, Women's DORMITORY and DINING HALL, $1,162,234; Men's DORMITORY, $679,600. Plans deposit $50 each. Potter, Tyler, Martin & Roth, 128 E. 6th St., Cincinnati, archts.

Ill., Antioch—BA 7/19—Antioch High School Dist. 117, 1133 S. Main St., HIGH SCHOOL ADDN. $995,000. Gilbert A. Johnson, American National Bank Bldg., Rockford, archts. CD 3/2/61.

BUILDINGS—SLC

O., Lorain—Catholic Diocese of Cleveland, 1027 Superior Ave., Cleveland, Zone 12, soon lets contract St. Peter CHURCH, Oberlin Ave., $900,000. Micholas Lesko & Assocs., 1404 E. 9th St., Cleveland, Zone 14, archt. CD 4/13/61.

HEAVY CONSTRUCTION—LB & CA

Complete General Constr. Co., 1221 E. 5th Ave., Columbus, O., LB LB **$721,662**, est. $900,000, Second Phase, Stelzer Rd. WATER MAIN, south to Livingston Ave., COLUMBUS, O. City, City Hall, Columbus, O. Burgess & Niple, 2015 W. 5th Ave., Columbus, O., engrs. BA 5/2/61. CD 4/7/61.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, ROADS,

Ill.—Arcole Midwest Corp., 3225 Main St., Evanston, Ill., CA **$836,258**, guard rail constr. 14.55 mi. Edens Expressway in and north of Chicago, Cook and Lake Counties; CA **$1,773,638**, paving Harlem Ave. paved ramps on FA 42, 99th St., Chicago, Cook Co.;

Ill.—Parro Constr. Co., 703 East University St., Urbana, Ill. and **McMahan Constr. Co.**, Rochester, Ind., CA **$1,529,002**, paving, incidental work for interchanges FA 13 north of Lawrenceville, Lawrence Co. Grand total $4,138,898. BA 4/21/61, CA 5/5/61. CD 4/25/61, under LB.

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, ROADS,

Triangle Constr. Co., 480 North Evergreen St., Kankakee, Ill., CA **$810,517**, paving, widening, base course 3.50 mi. Ill. 3 between Grimsby and Cora, Jackson Co. BA 4/21/61, CA 5/4/61. CD 4/25/61, under LB.

▲ **William E. Schweitzer & Co., Inc.**, 2207 Dodge Ave., Evanston, Ill., LB **$1,709,000**, No. 80.85-61-140, United Airlines HANGAR EXTENSION, O'Hare Airport, Park Ridge, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. BA 5/1/61. CD 4/26/61; **Darin & Armstrong**, 6155 S. Oak Park Ave., Chicago, Ill. LB **$569,000**. No. 80.85-60-133A Ozark Air Line MAINTENANCE BLDG., O'Hare Airport, Park Ridge (Chicago, Ill.)

BUILDINGS—LB & CA

▲ **Carmon Builders**, 32729 Belle Rd., Avon Lake, O., Owner Builds, **$1,275,000**, seventy bsmntless RANCH HOMES, Belle Acres, AVON LAKE, O. CD 12/6/60.

▲ **Coral Homes, Inc.**, 4275 Pearl Rd., Cleveland 9, O., Owner Builds, **$1,350,000**, 50 Lakeside Acres HOMES, off Electric Blvd., AVON LAKE O.

Fabe Constr. Co., 3700 Reading Rd., Cincinnati, O., Owner Builds, **$750,000**, 5 story, brick aluminum air-conditioned APARTMENT, SWIMMING POOL, Paddock Rd., CINCINNATI, O. George Godley, 918 E. Court St., Cincinnati, O., archt.

William Guentter & Sons, Inc., 2023 Dunlap St., Cincinnati, O., LB **$732,850**, (3 bidders), GREENWOOD HALL NURSES' HOME ADDN., remodel X-Ray PAVILION, CINCINNATI, O. Jewish Hospital, Burnet Ave., Cincinnati, O. BA 5/2/61. CD 4/5/61.

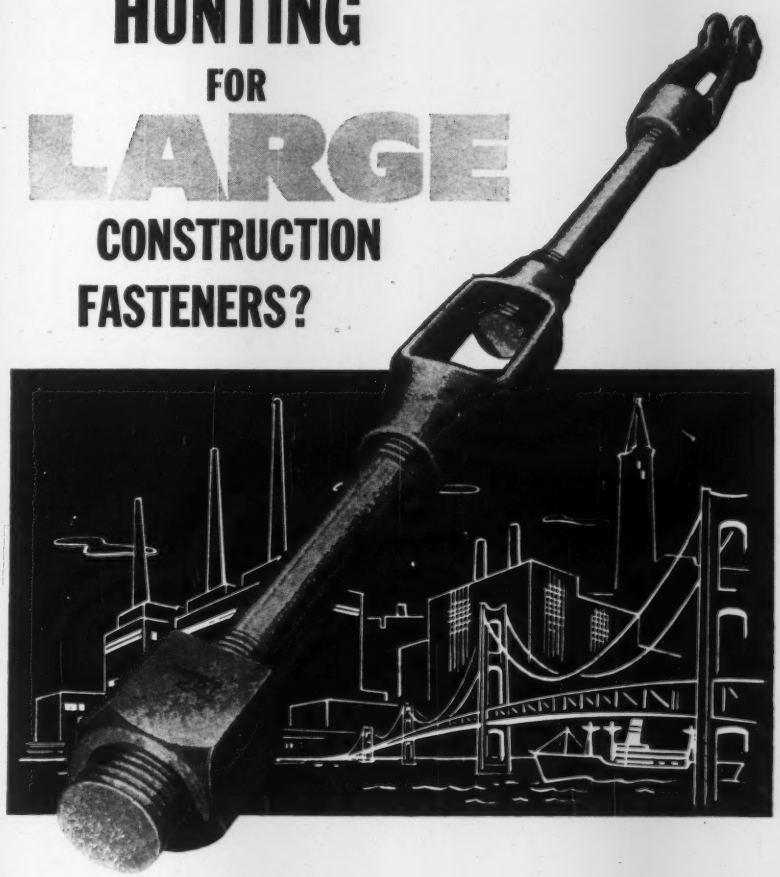
▲ **Gillmore-Olson Co.**, 1873 E. 55th St., Cleveland 3, O., CA Est **$2,250,000**, (9 bidders), WAREHOUSE-HEADQUARTERS, Pleasant Valley Rd., INDEPENDENCE, O. Thompson-Ramo Wooldridge, Inc., 23555 Euclid Ave., Cleveland 17, O. CD 2/3/61.

Medina Development & Building Corp., Medina, O., CA Est. **$750,000**, 75,000 sq. ft. BAR MILL, W. Smith Rd., MEDINA, O. Bliss & Laughlin, Harvey, Ill.

▲ **George Bahre Co.**, 3519 Southeastern St., Indianapolis, Ind., CA **$1,279,348**, general contract MEN'S DORMITORY, TERRE HAUTE, IND. Indiana State Teachers College, Admin. Bldg., Terre Haute, Ind., BA 4/26/61, CD 3/23/61;

(Continued on page 176)

HUNTING FOR LARGE CONSTRUCTION FASTENERS?



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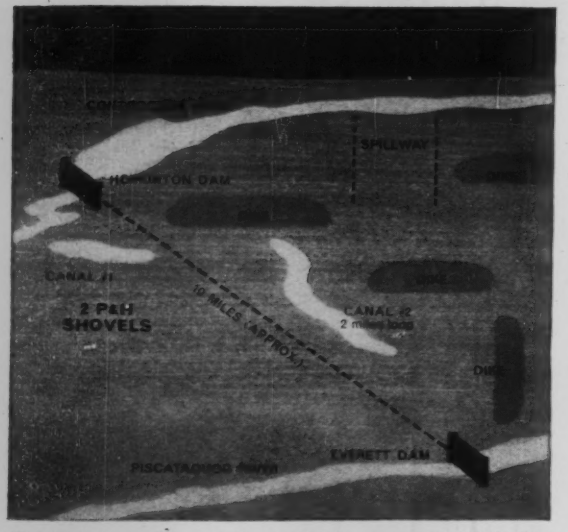
Every engineer needs this free digest of large fasteners. Write for Bulletin 160, Joseph Dyson & Sons, Inc., 5155 St. Clair Ave., Cleveland 3, Ohio, Phone HE 1-6157.

DYSON

4-yard P&H shovel takes only 4 passes to fill 17-yard haulers as it works on production-line basis.

"We need top yardage...we chose

...PERINI CORPORATION, Framingham,

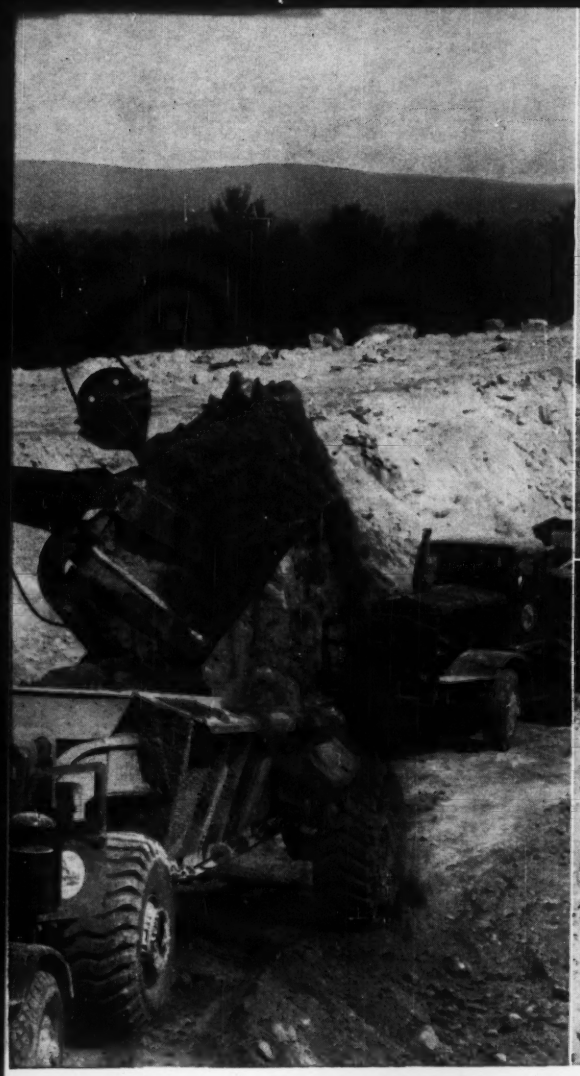


Drawing shows the overall construction area and details the nine separate phases of operation on this project.

Warren H. Pettengill, Project Manager, reports—
"Our two 4-yard P&H shovels give us faster, smoother work cycles . . . more yardage at the end of the day. This is important on a project that will take 3 years to complete, covers an area of 65 square miles and involves almost 7 million yards of rock, boulders, gravel and earth."

2 P&H Shovels Team Up On Excavation— Keep Haul Units Hustling

Warren Pettengill used his two P&H shovels as a team to handle the excavation on Canal No. 1. He found that both 4-yard P&H shovels maintained a 20-second work cycle . . . and loaded out the 17-yard capacity haul units in 4 passes. Both P&H machines, equipped with Magnetorque Drive for swing and propel, gave him faster and smoother work cycles . . . more precisely controlled starting and stopping for spotting loads over trucks . . . permitted his operators to maintain 20-second work cycles all day long without tiring them out.



Magnetorque-equipped P&H shovel digs boulders and earth as it makes a complete work cycle every 20 seconds.

P&H rapid-reversing chain crowd provides faster shovel retract and ease of operation — means faster, more positive digging.

P&H works from a bench as it loads hauling unit on a lower grade.

Magnetorque-equipped P&H shovels"

Massachusetts, $8,000,000 Merrimac River Flood Control Project, Hopkinton, N. H.

Top Yardage, On-Schedule-Performance Key To Operation

This flood control project involves many phases of operation, each dependent on the other. Roads must be relocated. Excavated material from canals and spillway must be used as fill in the construction of dikes and dams. A slowdown of yardage or a machine breakdown would seriously hamper coordinated scheduling and construction. Perini's P&H rigs have the built-in ruggedness and durability to stay on the job month after month with minimum downtime for servicing.

P&H Shovels Maneuver Well In Mud

Excavation has been carried out in soft, wet ground that has mired other equipment. The two P&H shovels with single roller crawler assemblies and 36″ wide crawler shoes have been able to maneuver without trouble and travel rapidly from one location to another. This is extremely important on this project where continuous production is vital to the overall operation.

For more information on this job, write for Case History Report 130 . . . to the world's largest manufacturer of power cranes and shovels—

HARNISCHFEGER P&H CONSTRUCTION & MINING DIVISION

Milwaukee 46, Wisconsin

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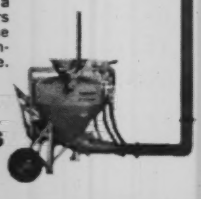

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Fully portable and ready-rigged.

BUCK EQUIPMENT CORP
720 ANDERSON FERRY RD. CINCINNATI 38, OHIO

(Continued from page 173)

Freitag-Weinhardt, Inc., 917 Eagle St., Terre Haute, Ind., CA $447,000, mechanical contract, MEN'S DORMITORY, (Terre Haute, Ind.).

▲ **Carl E. Erickson Co.**, 4657 North Ravenswood Ave., Chicago, Ill., CA Est. $8,000,000, 35 story, 248-unit APARTMENT, 1440 North Lake Shore Dr., CHICAGO, ILL. Howard F. Wallach & Jerrold Wexler, 120 South LaSalle St., Chicago, Zone 3, Ill. BA 3/23/61, CA about 5/1/61. CD 3/15/61.

▲ **Kelso Constr. Co.**, 1710 Lawrence Ave., Chicago, Ill. Owner Builds, $2,000,000, thirty-nine 4 unit APARTMENTS, Kenilworth Oaks, ELGIN, ILL.

▲ **A. Grignago**, 802 E. Olen Ave., Baraboo, Wis., LB $1,039,500, SENIOR HIGH SCHOOL, BARABOO, WIS. Bd. Educ., Baraboo, Wis. BA 4/25/61. CD 4/5/61.

▲ **Erickson & Lindstrom Constr. Co.**, 310 Sill Bldg., Flint 2, Mich., CA Est. $1,500,000, BREWING PLANT ADDN., FRANKENMUTH, MICH. Carling Brewing Co., 9400 Quincy Ave., Cleveland, O. BA 4/26. CD 4/13/61.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

Colo., Grand Junction—BA 5/24—State Planning Div., State Capitol Bldg., Denver, STUDENT CENTER for Mesa College. $700,000. Van Deusen & Bliska, 421 Glenwood Ave., Grand Junction, archts. CD 5/6/60.

† **N. D., Minot**—BA 5/26—U. S. Eng., 215 N. 17th St., Omaha 2, Neb., FPS 26 and FPS 27 RADAR TOWERS, Minot Air Force Base, ENG-25-066-61-147. $800,000. Extended date. CD 4/4/61.

▲ **Tex., Waco** — BA 6/7 — City, City Hall, STORM DRAINAGE SYSTEM, incl. 6,100 lin. ft. 16 in. rein.-con. horseshoe conduit and incid. imprvs. $1,430,000. Plans deposit $25. Forrest & Cotton, 600 Vaughn Bldg., Dallas, engrs. CD 12/18/57.

▲† **Minnesota**—BA About 6/13—U. S. Eng., 1217 U. S. Post Office & Custom House, St. Paul, Zone 1, LOCAL FLOOD PROTECTION PROJ., Stage I, right bank of Mississippi River 1.5 mi. extending from point about 600 ft. upstream of Belle St. to point downstream near Chester St., St. Paul, CIVENG-21-018-61-32. Approx. $2,000,000. Plans deposit $7. CD 9/21/60.

BUILDINGS—BA

▲ **Minn., Rochester**—BA 5/23—Bd. Educ. Special Dist. No. 4, Box 121, 4 story, 54 classroom JUNIOR HIGH SCHOOL, swimming pool. $1,500,000. Plans deposit $50. Ellerbe & Co., 333 Sibley St., St. Paul, and 301 First National Bank Bldg., archts.-engrs. CD 9/5/60.

▲ **Minn., Rochester**—BA 5/23—City, City Hall, 7 story, 50x55 ft. steel frame Silver Lake POWER PLANT ADDN. $1,000,000. Pfeifer & Shultz, Wesley Temple Bldg., Minneapolis, engrs. CD 5/11/60.

▲ **Mo., Kansas City**—BA 5/25—Bd. Educ., 1211 McGee St., 1 and 2 story U-shaped, concrete block, brick Inter-City JUNIOR HIGH SCHOOL, 28th St. Terrace and Hardy. $2,000,000. Plans deposit $50 general, $25 mechanical trades. Marshall & Brown, 1016 Baltimore, Kansas City, Mo., archts. CD 1/6/61.

▲† **Wyo., Cheyenne**—BA 5/25—Base Procurement Office, Warren Air Force Base, 100 unit CAPEHART HOUSING, Francis E. Warren Air Force Base. $1,700,000. J. T. Banner & Assocs., 4091 S. 4th St., Laramie, archts. CD 11/2/60.

▲ **Minn., Minneapolis**—BA 6/6—University of Minnesota, 404 Admin. Bldg., Zone 14, (A) SOCIAL SCIENCE-HUMANITIES BLDG. on West Campus, $2,000,000, Plans deposit $35. The Cerny Assocs., Inc., 300 First National Concourse Bldg., Minneapolis 2, Minn., archt.-engr. (B) SCHOOL of BUSINESS ADMINISTRATION BLDG. on West Campus; $1,500,000, Plans deposit $25, Hammel & Green, Inc., 2650 University Ave., St. Paul 14, Minn., archt.-engr. (C) general purpose CLASSROOM BLDG. on West Campus, $1,500,000, Plans deposit $25, Setter, Leach & Lindstrom, Inc., 133 Foshay Tower, Minneapolis 2, Minn., archt.-engr. CD 11/19/59.

▲ **Tex., Corpus Christi**—Bids Asked—Owner, c/o Morris L. Levy, archt., Kaffine Bldg., Phase No. 1, MEAT PACKING PLANT, North of Tule Ship Channel, and CORN PRODUCTS PLANT; Phase 2, FEED and STOCK PENS; Phase 3, 50 acre site grounds drainage and drainage, $1,500,000. CD 3/9/61.

▲ **Tex., San Antonio**—Bids Asked—Morris Kallison, 124 S. Flores St. (selected list of bidders), 10 story OFFICE, $3,000,000; PARKING GARAGE, $400,000. Altee B. & Rob. M. Ayres, 342 W. Woodlawn Ave., archts. Reynolds & Morgan, 1003 Insurance Bldg., and Martin Staley, No. 31 Chandler Bldg., engrs. CD 2/10/61.

BUILDINGS—SLC

▲ **Tex., Houston**—Lakeland Center Corp., c/o Paul & Paul, archts., Pappas Bldg., Houston, soon lets contract SHOPPING CENTER. $1,000,000. CD 4/12/61.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul, ROADS,
Minn.—**Barton Contg. Co.**, Osseo, Minn., CA $1,549,610, grading, gravel base and conc. pavt. 9.1 mi., Pine Co.;
Minn.—**Hoover Constr. Co.**, Virginia, Minn., and **Morse Bros. & Assocs., Inc.**, 705½ S. Broadway, Rochester,

Minn., CA **$837,675**, grading, crushed rock base and road-mixed bit. surf. 3.5 mi., Wabasha and Winona Counties. BA 4/21. CD 4/25/61, under LB.

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul, BRIDGES,

Minn.—**Brogan Constr. Co.**, 321 Locust St., Des Moines 9, Iowa, CA **$540,875**, Bridge No. 9294 over three tracks in New Ulm, Brown Co. CD 4/28/61, under LB;

Minn.—**Ashbach Constr. Co.**, 1910 W. County Rd. C, St. Paul, Minn., CA **$516,112**, Bridge No. 9377, grading and misc. constr., Ramsey Co. BA 4/21. CD 4/25/61, under LB.

▲ **Foley Bros., Inc.**, New York Bldg., St. Paul, Minn.; **Hurley Constr. Co.**, 403 S. Robert St., St. Paul, Minn., and **Winston Bros. Co.**, 301 Clifton Ave., Minneapolis, Minn., CA **$2,158,361**, 8,037 lin. ft. STORM SEWER TUNNEL along Stevens and Second Ave. S., Hennepin Co., MINNESOTA. State Hy. Dpt., Capitol Approach, St. Paul, Minn. BA 4/21. CD 4/25/61, under LB.

† **Pine Bluff Sand & Gravel Co.**, P.O. Box 248, Pine Bluff, Ark., CA **$778,692**, constr., repair DIKE and REVETMENT, Missouri River, Omaha Blackbird Bends, CIVENG-25-066-61-115, IOWA and NEBRASKA. U. S. Eng., 215 N. 17th St., Omaha 2, Neb. BA 4/27/61. CA 5/3/61. CD 5/3/61, under LB.

▲ **MISSOURI**—State Hy. Dpt., Jefferson City, Bids opened 4/28, ROADS,

Mo.—**Barnard McMenamy Contr., Inc. and Subsidiaries**, 1600 Fair Lane, St. Charles, Mo., LB **$173,953** (8 bidders) grd., culverts R.S. base and 24 ft. b. conc. pavt. 0.833 mi. Proj. U-484(5), Franklin Co.; LB **$990,529**, (8 bidders), grad., culverts, R.S. base and 24 ft. b. conc. pavt. 6.42 mi. Proj. F-484(2), Franklin Co.;

Mo.—**Howard Constr. Co.**, 1504 N. Osage, Sedalia, Mo., LB **$274,338**, (3 bidders), grad., culverts, 24 ft. b. conc. surf. 2.497 mi. Proj. F-297(9), Worth Co.; LB **$590,600**, (3 bidders), grad., culverts, 24 ft. b. conc. surf. 4.545 mi. Proj. F-524(2), Gentry Co. CD 4/5/61.

R. E. Reutzel Co., North Hy. 77, Fremont, Neb., CA **$750,000**, NATURAL GAS DISTRIBUTION SYSTEM, Tarkio, Fairfax and Rockport, MISSOURI. American Gas Co., 546 So. 24 Ave., Omaha, Neb.

▲† **Southern Engineering & Constr. Co.**, Inc., 2650 Cherry Ave., Long Beach 6, Calif., LB **$888,888**, est. $898,325, Schedule 3, HANGAR, MAINTENANCE DOCKS, other facilities, Grand Forks Air Force Base and Minot Air Force Base; LB **$395,118**, est. $404,507, Schedule 2, HANGAR, MAINTENANCE DOCKS, other facilities, Minot Air Force Base, ENG-25-066-61-141, NORTH DAKOTA. U. S. Eng., 215 N. 17th St., Omaha 2, Neb. BA 5/2/61. CD 4/10/61, under N. D., Grand Forks as project location;
Fred R. Comb Co., 2901 Aldrich Ave. S., Minneapolis, Minn., LB **$506,802**, est. $493,816, Schedule 1, HANGAR MAINTENANCE DOCKS, other facilities, Grand Forks Air Force Base, ENG-25-066-61-141 (NORTH DAKOTA).

▲ **NEBRASKA**—Dpt. Roads, State Capitol, Lincoln, Zone 9, bids opened 5/4, ROAD,

Abel Constr. Co., 1815 Y St., Lincoln, Neb., LB **$1,155,268**, (2 bidders), 1.2 mi. paved road, O St. from 32 to 50th in Lincoln, grading, pavement, culverts, seeding, traffic signals, lighting, Proj. No. W-133(20), Lincoln, Lancaster Co. CD 4/19/61.

▲† **H. B. Zachry**, Box 10188, San Antonio, Tex., LB **$1,487,494**, est. $1,216,846, (4 bidders), EARTHWORK, CONCRETE LINING STRUCTURES for Main Canal, San Angelo Proj., DC 5566, San Angelo, TEXAS. Bureau Reclamation, Dpt. Interior, San Angelo, Tex. BA 5/4/61. CD 4/6/61.

Elder Constr. Co., 5907 Buelow St., Houston, Tex., CA **$519,000**, STORM SEWERS, NE Sect., HOUSTON, TEX. City, Dpt. P. Wks., City Hall, Houston, Tex. BA 4/4/61. CD 9/16/49.
English Constr. Co., Inc., 1042 Conrad Sauer Rd., Houston, Tex., CA **$213,331**, STORM SEWERS, SE sect. near Pasadena (Houston, Tex.).

▲ **COLORADO**—State Hy. Dpt., 4201 East Arkansas Ave., Denver, BRIDGE,

Peter Kiewit Sons' Co., P. O. Box 8787, University Park Station, Denver, Colo., CA **$1,108,322**, est. $1,056,000, (8 bidders), structures, approaches, 6.836 mi., Proj. I-25-3(22)251, East of Loveland, Weld and Larimer Counties. BA 5/5/61. CD 4/18/61.

BUILDINGS—LB & CA

▲ **Robin Hood Constr. Co.**, 1143 Dupont Ave. N., Minneapolis, Minn., Owner Builds, **$5,000,000**, 15 story Capp Towers MOTOR HOTEL with roof-top SWIMMING POOL and 3 story, 300-car PARKING RAMP, 13th St. and Nicollet Ave., MINNEAPOLIS, MINN. Ackerberg & Cooperman, 1216 Nicollet Ave., Minneapolis, Minn., archts.

▲ **McGough Constr. Co.**, 2711 Fairview Ave. North, St. Paul, Minn., LB **$2,531,000**, (10 bidders), general contract Harding HIGH SCHOOL near Fremont Ave. and Hazelwood St., ST. PAUL, MINN. Bd. Educ. Special School Dist. No. 2, 628 City Hall and Court House, St. Paul, Minn., BA 5/2, CD 3/27/61;
Gruden Bros. Co., 635 Prior Ave. North, St. Paul, Minn., LB **$702,600**, (5 bidders), mechanical work HARDING HIGH SCHOOL (St. Paul, Minn.).

Fairbanks, Morse & Co., 902 Harney St., Omaha, Neb., CA **$525,675**, DIESEL ENGINE GENERATOR, 2200/2600 kw with auxiliaries, MAQUOKETA, IOWA, City, City Hall, Maquoketa, Iowa. BA 3/16/61. CD 4/21/61, under LB.

Miceli Constr. Co., 203 N. Meramec Ave., Clayton 5, Mo., CA Est. over **$600,000**, 60 HOUSES, Hern, Wynhurst, Greenway and N. Berkeley in North Hills Acres, BERKELEY (St. Louis 34 P.O.), MO. Roy

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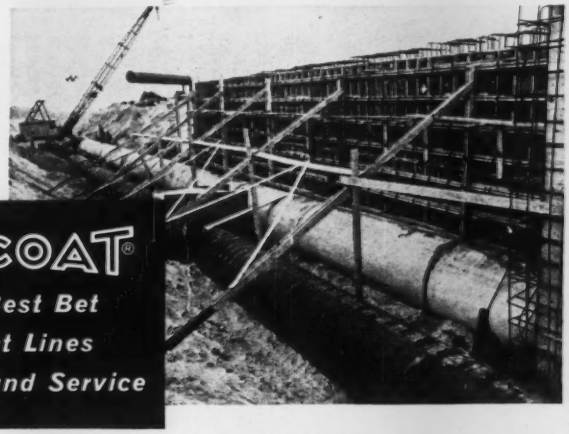

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Powell Real Estate Co., 32 S. Central Ave., Clayton 5, Mo.

▲ **J. E. Hathman, Inc.**, Hathman Bldg., Columbia, Mo., LB **$1,394,655**, (3 bidders), general contract 4 story DORMITORY, 5 story DORMITORY and 2 story DINING HALL for Men, Providence Rd. and Kentucky Ave., COLUMBIA, MO. Curators of University of Missouri, 116 Jesse Hall, Columbia, Mo. BA 5/3. CD 4/11/61; **J. Louis Crum Corp.**, Boone Bldg., Columbia, Mo., LB **$609,945**, (4 bidders), heating, ventilating and plumbing, 4 story DORMITORY; 5 story DORMITORY and 2 story DINING HALL for Men, (Columbia, Mo.).

Bentley Development Co., 808 Carondelet Ave., Clayton 5, Mo., Owner Builds, **$800,000**, 88 frame RESIDENCES, Cedar Brook No. 3 Subdivision, School Dist. R-1, HAZELWOOD, MO.

Fischer & Frichtel, Inc., 8703 St. Charles Rock Rd., Overland 14, Mo., CA **$700,000**, RECREATIONAL BLDG., incl. 24-lane bowling center, Carrollton Shopping Center, Natural Bridge Rd. west of Lindbergh Blvd., HAZELWOOD, MO. Carrollton Bowling Lanes, c/o George Ganousis, 4438 Vance Ave., St. Louis 34, Mo.

▲ **Vorhof-Duenke Co.**, 7567 St. Charles Rock Rd., St. Louis 33, Mo., Owner Builds, **$1,000,000**, 1 story, 72,500 sq. ft. concrete blocks, steel, concrete STORE, parking, JENNINGS (St. Louis 36 P.O.) Mo. Atlantic Thrift Mills Center, 9800 Hall's Ferry Rd., lessee, Abeyta & Speight, 3403 E. 28 St., Fort Worth, Tex., engrs. CD 12/19/60.

▲ **Rosenblum Constr. Co.**, 11305 Olive St. Road, Creve Coeur 41, Mo., Owner Builds, **$1,140,000**, thirty 4-family brick, concrete APARTMENTS, James Jennings Estate at Lucas and Hunt Rds., NORMANDY (ST. LOUIS 20 P.O.), MO.

▲ **Donovan Constr. Co.**, 1725 Carroll Ave., St. Paul, Minn. and **W. A. Klinger, Inc.**, Box 1768, Sioux City, Iowa, LB **$6,799,450**, 1,044 units ARMED SERVICES CAPEHART HOUSING, GRAND FORKS, N. D. Base Procurement Office, Grand Forks Air Force Base, Grand Forks, N. D. BA about 4/12/61. CD 3/16/61.

▲ **Peter Kiewit Sons Co.**, 1024 Omaha Natl. Bank Bldg., Omaha, Neb., LB **$1,724,950**, (4 bidders), general contract 125,000 kw. fourth unit North Omaha STATION, OMAHA, NEB. Omaha Public Power Dist., 803 Electric Bldg., Omaha, Neb. BA 5/4/61. CD 4/19/61.

▲ **Mainelli Constr. Co.**, 4502 S. 36th St., Omaha, Neb., LB **$1,125,000**, (7 bidders) general contract Southeast JUNIOR HIGH SCHOOL, 31 classrooms, offices, auditorium, gym, music rooms, etc., 90th and U Sts., OMAHA, NEB. Omaha Bd. Educ., 3902 Davenport St., Omaha, Neb. BA 5/4/61. CD 4/5/61.

Dondlinger & Son Constr. Co., Inc., 1206 East Lincoln St., Wichita, Kan., LB **$577,600**, 3 story, bsmnt., 90,000 sq. ft. LIBRARY, WICHITA, KAN. University of Wichita 1845 Fairmount St., Wichita, Kan. Architects Associated, 2314 East Central St., Wichita, Kan., archts. CD 5/7/59.

▲ **Walter Nashert Co.**, 16 N.E. 27th St., Oklahoma City, Okla., CA **$1,214,037**, (15 bidders), Municipal HOSPITAL, MIDWEST CITY, OKLA. City, City Hall, Midwest City, Okla. BA 5/2/61. CD 4/25/61.

Shiflet Brothers Constr. Co. 411-A ES 11, Abilene, Tex., LB **$855,465**, 1 block long DOWNTOWN MALL SHOPPING CENTER, ABILENE, TEX. Downtown Abilene Markets, Inc., 325 Hickory St., Abilene, Tex. CD 1/12/60.

▲ **Humble Oil & Refining Co.**, 1216 Main St., Houston, Tex., Owner Builds, **$1,850,000**, desulphurization PLANT ADDN., BAYTOWN, TEX. CD 1/12/61.

▲ **Butcher & Sweeney**, 1633 Rogers Rd., Fort Worth, Tex., LB **$3,084,756**, est. $3,500,000, concrete JAIL and CRIMINAL COURTS BLDG. ADDN., FORT WORTH, TEX. Tarrant Co., Fort Worth, Tex., BA 5/4/61, CD 3/28/61;
Southern Steel Co., 4634S. Presa St., San Antonio, Tex., LB **$778,863**, (8 bidders), JAIL EQUIPMENT for county jail and criminal courts bldg. addn., (San Antonio, Tex.).

▲ **W. S. Bellows Constr. Corp.**, 716 N. Everton St., Houston, Tex., CA Est. **$8,000,000-$12,500,000**, Phase 4, 21 to 22 story OFFICE, 500 Jefferson St., HOUSTON, TEX. Cullen Center, Inc., Gerald E. Veitmann, pres., 500 Jefferson Bldg., 1st City Natl. Bank Bldg., Houston, Tex. BA 4/4/61. CD 2/23/61.

Cargay Building Corp., 7031 Sharpcrest St., Houston, Tex., Owner Builds, **$885,000**, $500,000 first year, 1½ years to complete. 58 DWELLINGS, Sect. 5, Sharpstown, HOUSTON, TEX.

▲ **Letch Building Co.**, 7127 Neff St., Houston, Tex., Owner Builds, **$1,100,000**, 72 DWELLINGS, Sec. 5, Sharpstown, HOUSTON, TEX.

Moore Building Corp., 7050 Sharpcrest St., Houston, Tex., Owner Builds, **$790,000**, $500,000 1st year 1½ years to complete, 65 DWELLINGS, Sec. 5, Sharpstown, HOUSTON, TEX.

Raleigh A. Smith, Sr., Inc., 5710 Airline Rd., Houston, Tex., Owner Builds, **$575,000**, 30 DWELLINGS, Bidden Valley Addn., HOUSTON, TEX.

Traditional Homes, Inc., 2635 Main St., Houston, Tex., Owner Builds, **$565,000**, 20 DWELLINGS, Timber Cove and El Lago Subdivisions, HOUSTON, TEX.

▲ **E. I. du Pont & De Nemours & Co.**, du Pont & Nemours Bldg., Wilmington, Del., Owner Builds, **$4,000,000**, high pressure polyethylene vinyl resin, PLANT, Sabine Works, ORANGE, TEX.

Murray Winn, Builder, 201 Windcrest St., San Antonio, Tex., Owner Builds, **$648,000**, 53 ADDNL. DWELLINGS, in Windcrest, SAN ANTONIO, TEX.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Wash., Seattle**—BA 6/1—Municipality of Metropolitan Seattle, 152 Denny Way, INFLUENT and EFFLUENT SEWERS for Renton Sewage Treatment Plant, $1,350,000; first section EASTSIDE INTERCEPTOR SEWER, $3,650,000; smaller SEWERS, $2,475,000. Plans deposit $125. CD 8/28/59.

▲ **Calif., Los Angeles**—BA 6/2—Los Angeles County Flood Control Dist., 2250 Alcazar St., rein.-con. CONDUIT for Dominguez Channel, Compton Blvd. to Rosecrans Ave., Gardena. $1,200,000. CD 10/18/60.

▲ **Calif., Los Angeles**—BA 6/9—Los Angeles County Flood Control Dist., 2250 Alcazar St., LEVEE FACING and INVERT for Ballona Creek, Pacific Ave. to Centinela to LaSalle Ave., Culvert City and Los Angeles. $1,335,000. Plans deposit $2.60. CD 10/18/60.

Calif., Los Angeles—BA 6/9—Los Angeles County Flood Control Dist., 2250 Alcazar St., Proj. 551, Lynwood STORM DRAIN, Lynnwood. $764,400. Plans deposit $2.60. CD 11/10/58.

▲† **Washington**—BA 7/6—U. S. Eng., City-County Airport, Walla Walla, 13, 212,400 hp. Kaplan-type HYDRAULIC TURBINES for Lower Monumental and John Day Dams, Inv. 61-46, Over $10,000,000. CD 10/3/60.

BUILDINGS—BA

▲ **Wash., Tacoma**—BA 5/25—Clover Park School Dist., 5214 Steilacoom Blvd. S.W., 160,000 sq. ft. steel frame HIGH SCHOOL, concrete fdn. $2,825,000. Plans deposit $50. D. R. Burr & Assocs., 6103 Mt. Tacoma Dr. S.W., archts. CD 12/13/60.

▲ **Calif., Santa Ana**—BA 6/1—Bd. Supervs. Orange Co., Court House, 5 story ACUTE DISEASES UNIT ADDN. Orange County Hospital. $4,000,000. Bids Apr. 26 rejected, LB **$4,590,000.** CD 5/2/61, under LB.

▲ **Calif., Riverside**—BA 6/6—Bd. Regents University of California, Admin. Bldg., Berkeley, 3 story rein.-con. HUMANITIES BLDG., Riverside Campus. $2,750,000.

HEAVY CONSTRUCTION—LB & CA

† **C. Berg, Inc.,** 27300 Westlake Ave. N., Seattle, Wash., LB **$587,000,** est. $556,718 (5 bidders), ENLARGE, ALTER BLDGS. for AIRMEN'S DORMITORIES, Northeast Cape Air Force Station, Inv. 61-45, NORTHEAST CAPE, ALASKA. U. S. Eng., P.O. Box 7002, Anchorage, Alaska. BA 5/4. CD 4/14/61.

† **M-B Contg. Co., Inc.,** De Barr Rd., Anchorage, Alaska, LB **$570,901,** est. $740,825, (5 bidders), REPAIR RUNWAY and AIRFIELD LIGHTING, Inv. 61-43, ELMENDORF AIR FORCE BASE, ALASKA. U. S. Eng., P. O. Box 7002, Anchorage, Alaska. BA 5/2. CD 4/11/61.

▲ **IDAHO**—Dpt. Hys., 3211 State St., Boise, ROADS, **Rogers Constr. Co.,** 11760 N.E. Glisan St., Portland, Ore., CA **$1,556,261,** 4-lane divided roadway, 4 concrete underpasses, 2 twin concrete bridges, irrigation structures and plant-mix bit. surf. 6.445 mi. Interstate 15 near Idaho Falls, Proj. 1-15-3(7)111, Bonneville Co. BA 4/25/61. CA 5/3/61. CD 5/2/61, under LB.

▲ **UTAH**—State Rd. Comn., State Office Bldg., Salt Lake City, Zone 14, ROADS,
Gibbons & Reed, 825 W. 9th North, Salt Lake City, Zone 16, Utah, CA **$2,646,979,** Interstate Hy. between First and Eighth Sts., Salt Lake Co. BA 4/25/61. CA 5/2/61. CD 5/2/61, under LB.

† **Murray J. Shiff Constr. Co.,** P.O. Box 1190, Tucson, Ariz., CA **$707,500,** est. $693,600, 60 in. ASTROMETRIC REFLECTOR OBSERVATORY BLDG., Spec. 36821, FLAGSTAFF, ARIZ. Dist. P. Wks., 11th Naval Dist., 1220 Pacific Hy., San Diego 1, Calif. BA 5/2/61. CA 5/4/61. CD 5/5/61, under LB.

CALIFORNIA—State Div. Hys., 1120 N St., Sacramento, ROAD,
Baldwin Contg. Co., Inc., 9th and Yuba Sts., Marysville, Calif., CA **$565,669,** reconstr. 34 mi. US Hy. 66 between 16 mi. west of Amboy and 26 mi. west of Needles, San Bernardino Co. BA 4/20. CA 5/4. CD 4/26/61, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, Bids opened 5/3, ROADS,
Calif.—Paul V. Pollock & Son, P.O. Box 1690, Ventura, Calif., LB **$815,744** (5 bidders), grading, paving 3.6 mi. to wid'n. and realign Cliff Dr. and Las Positas Rd. (State Hy. Rte. 150) between La Marina and US Hy. 101 in and near Santa Barbara, Santa Barbara Co.;
Calif.—Arthur B. Siri, Inc., 1357 Cleveland Ave., Santa Rosa, Calif., LB **$739,024** (7 bidders), grading, surf. to constr. 4.7 mi. modern 2 lane hy. on State Sign Rte. 53 between Harris Creek and Lower Lake, Lake Co. CD 4/6/61.

▲ **CALIFORNIA**—State Div. Hys., 120 So. Spring St., Los Angeles, ROAD,
Riha Constr. Co. & C. W. McGrath Enterprises, 5429 University Ave., San Diego, Calif., CA **$3,897,623,** grading, paving to constr. 5.1 mi. 4 lane freeway on Sign Rte. 78 between 1 mi. west of Vista and Rancho Santa Fe Rd., San Diego Co. BA 4/20. CD 4/25/61, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, ROAD,
Griffith Co., 1060 S. Broadway, Los Angeles, Calif., CA **$3,274,578,** grading, paving and bridges 13.3

(Continued on page 182)

CENTRILINE

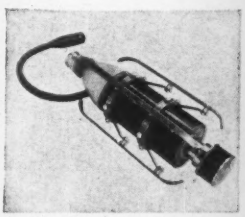
grants NEW LIFE to old pipelines of 4" to 144" in diameter

HOW CENTRILINE HELPS • By giving a uniform cement-mortar lining to old pipes—**in place**—Centriline produces these benefits: • Stops corrosion and tuberculation permanently • Prevents all leakage • Permanently establishes highest hydraulic capacity.

SIX CENTRILINE ECONOMIES • By lining pipes in place you avoid expensive excavations • Old lines regain new carrying capacity • Pressure goes up, pumping costs go down • Pipe life is prolonged indefinitely • Centrilining saves time, because so much of the process is fast and automatic • New pipe, Centrilined **before** installation, prevents tuberculation, corrosion.

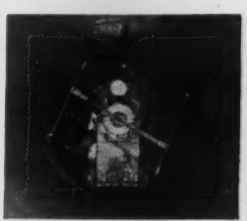
HOW CENTRILINE WORKS • After pipe is cleaned, machines apply cement-mortar to the inside walls. In larger pipe sizes, automatic trowels smooth lining to uniform thickness, determined by the speed of the machine. Centriline offers complete contract service.

PIPE RECONDITIONING FOR ALL SIZES



4"-14": Machine slides past corporation cocks and laterals without excavation. For small mains, fire lines, distribution grids. About 500 feet between openings.

16"-22": Self-propelled machine with automatic trowelling attachments. About 800 feet between openings.



24"-144": Operator drives machine through pipe. Lining trowelled to smooth finish. About 1200-1800 feet between openings.

For further information, send for our illustrated brochure.

CENTRILINE CORPORATION

A Subsidiary of Raymond International Inc.

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Since 1938...

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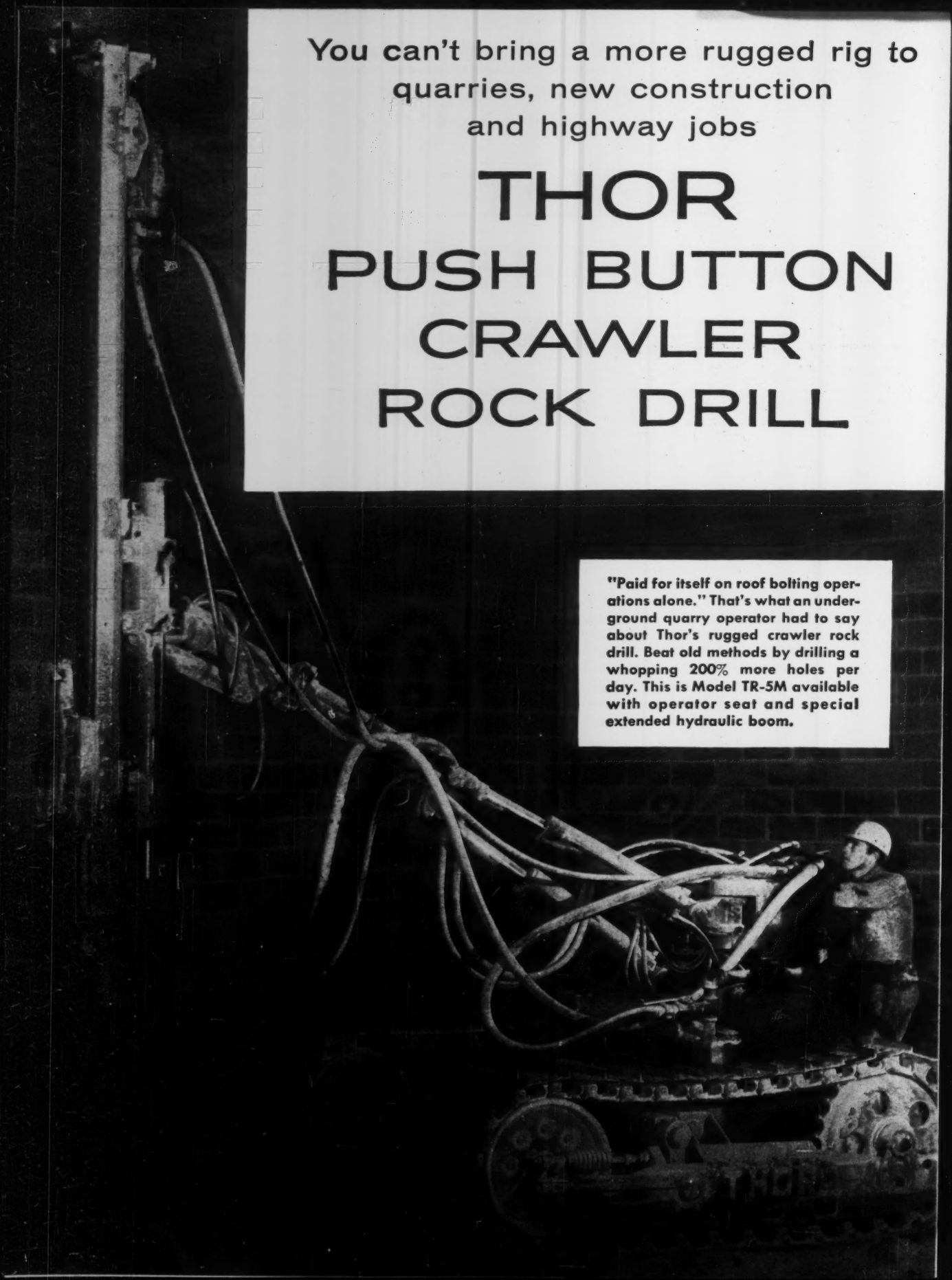
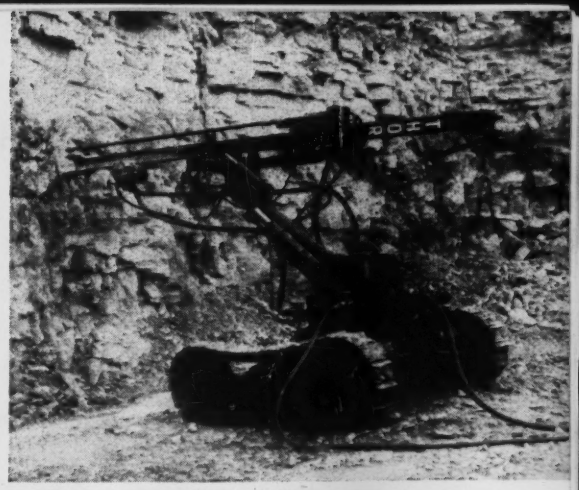
This trademark has identified the original and most widely-used protective coating for blacktop pavements. It doubles service life, reduces maintenance expense, improves appearance . . . protects your investment.

MAINTENANCE INC. WOOSTER OHIO

Write for Bulletin S-2992 Distributors Everywhere

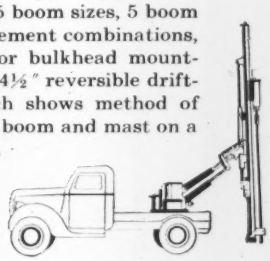

You can't bring a more rugged rig to quarries, new construction and highway jobs
THOR
PUSH BUTTON
CRAWLER
ROCK DRILL
"Paid for itself on roof bolting operations alone." That's what an underground quarry operator had to say about Thor's rugged crawler rock drill. Beat old methods by drilling a whopping 200% more holes per day. This is Model TR-5M available with operator seat and special extended hydraulic boom.

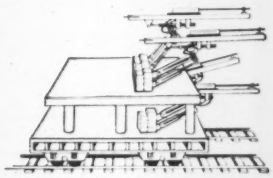
Push button control and precise finger-tip hydraulic positioning of both mast and drifter usher in a new era in high speed hole drilling. Five operating levers spot boom and mast to any position in any terrain. All this and power feeding of the drifter, too. Let one of our Thor "Red Tool" distributors or factory experts show this magic of the TR-5 right in the comfort of your own office via Thor's film "From Rocks to Riches." Check the Yellow Pages or write, Thor Power Tool Company, Aurora, Illinois.



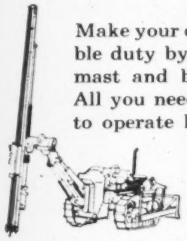
Flexibility Unlimited!

Can't use the whole rig? Thor will supply you the boom or the mast separately. Your choice of 5 boom sizes, 5 boom head movement combinations, platform or bulkhead mounting, 4″ or 4½″ reversible drifters. Sketch shows method of mounting boom and mast on a truck bed.





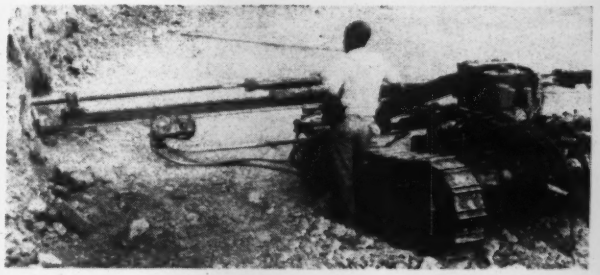
Underground operations? Build your own multiple "Jumbo" by mounting several TR-5, masts and booms, on a mine car.



Make your old tractors do double duty by mounting a TR-5 mast and boom on the rear. All you need is the air supply to operate hydraulic controls.

ALL AIR AND HYDRAULIC CONTROLS mean easy, one-man operation. Complete flexibility of the TR-5 raises boom and mast into position quickly. Rig locks tracks into place and powerful Thor drifter goes into action.

ROUGH, UNEVEN TERRAIN presents no problems. Unique construction allows mast and boom to remain level. Boom and mast can be raised or lowered, mast can be swung from side to side, forward or back —all hydraulically.



TOE HOLE DRILLING IS EASY with the TR-5. The boom and mast can be lowered flat to the ground for toe or lifter holes. Automatic dump and cone control are operated hydraulically.

DRILL DOWN HOLES IN RECORD TIME, even on ground like this. Three 8 h.p. rotary air motors propel the compact machine and operate the hydraulic system. Powerful Thor drifters feature reverse rotation for easy steel change.

THOR POWER TOOL COMPANY, AURORA, ILLINOIS

Thor POWER TOOLS

ATLANTA • BIRMINGHAM • BOSTON • BUFFALO • CHICAGO
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(Continued from page 179)

mi. U. S. Hy. 99 from Expressway to Freeway standards between Pixley and Tulare Airport, Tulare Co. BA 4/26. CD 4/28/61, under LB.

▲ **Donald Drake Co.**, 1600 Northwest Savier, Portland, Ore., CA $1,429,602, PENSTOCK, ACCESS ROAD and APPURTENANT WORKS, Union Valley Powerhouse, Upper American River Proj., El Dorado Co., SACRAMENTO, CALIF. Sacramento Municipal Utility Dist., Hydroelectric Constr. Dpt., 6201 S St., Sacramento, Calif. BA 4/27. CA 5/4. CD 5/3/61, under LB

▲ **Ries Constr. Co.**, 5234 El Cajon Blvd., San Diego 15, Calif., LB $1,115,000, est., over $1,000,000 (10 bidders), Chollas OPERATION STATION, SAN DIEGO, CALIF. City Purchasing Agent, Rm. 161, Civic Center Bldg., San Diego 1, Calif. BA 5/3. CD 4/17/61.

BUILDINGS—LB & CA

† **J. B. Warrack Co.**, 400 2nd Ave. W., Seattle, Wash., CA $686,425, 1 story, bsmnt., 35,261 sq. ft. rein.-con., frame Orion JUNIOR HIGH SCHOOL ADDN., Proj. AAA-60-C FED-3A-10, ELEMENDORF AIR FORCE BASE, ALASKA. U. S. Housing & Home Finance Agency, First National Bank Bldg., Anchorage, Alaska. BA 4/27. CD 5/5/61, under LB

Gwinn Constr. Co., 914 Rainier Ave., Seattle, Wash., LB $616,530, 1 story, 65,000 sq. ft., masonry STORE, SEATTLE, WASH. Marketime Drugs, Inc., 7101 Empire Way, Seattle, Wash. BA 5/2/61. CD 4/27/61.

Alfred Brown, 310 Dooly Bldg., Salt Lake City, Zone 1, Utah, CA $651,088, est. $650,000, MARRIED STUDENT HOUSING, State University, LOGAN, UTAH. State Bldg. Bd., 419 State Capitol, Salt Lake City, Utah. BA 4/4/61. CA 5/2/61. CD 4/11/61, under LB

▲ **C. L. Peck**, 816 West Fifth St., Los Angeles 17, Calif., CA $2,138,000, 5 story, 50,000 sq. ft. HOSPITAL ADDN. FULLERTON, CALIF. St. Judes Hospital, c/o Welton Becket & Assoc., archts., 10000 Santa Monica Blvd., Los Angeles, Calif. BA 3/23. CD 3/14/61

R. & W. Warmington Co., 5524 N. Rosemead Blvd., Temple City, Calif., Owner Builds, $822,573, 61 DWELLINGS, Tract 3843, GARDEN GROVE, CALIF.

▲ **Tom E. Norcross, Inc.**, 6053 Atlantic Ave., Long Beach, Calif., CA $5,177,000, Women's DETENTION FACILITY, Biscaluz Center, Monterey Park, LOS ANGELES, CALIF. Bd. Supervs. Los Angeles County, 500 W. Temple St., Los Angeles, Calif. BA 3/29, CA 5/2. CD 4/3/61, under LB

Sherlock Homes No. 2, 1332 Orange St., Riverside, Calif., Owner Builds, $783,000, 58 stucco DWELLINGS, Tract 3930, ORANGE, CALIF.

▲ **Dinwiddie Constr. Co.**, Crocker Bldg., San Francisco, Calif. CA $5,500,000, (13 bidders), 3 story Northern Counties Area HEADQUARTERS OFFICE near SACRAMENTO, CALIF. Pacific Telephone Co., 3240 Arden Way, Sacramento, Calif. BA 5/2. CD 4/14/61.

▲ **Trepte Constr. Co.**, 1402 Murray Canyon Rd., San Diego 11, Calif., CA $1,531,470, general contract 6 story, bsmnt., 179,500 sq. ft. GENERAL OFFICE BLDG., for State Dpt. Finance, W. O. 3848GC-5, SAN DIEGO, CALIF. State Div. Architecture, 107 S. Broadway, Los Angeles, Calif. BA 4/26, CA 5/2. CD 4/28/61, under LB.

Leon Slavin, 470 S. San Vicente Blvd., Los Angeles 48, Calif., LB $866,000, (3 bidders) ALTERATIONS, BLDG. A & B at Santa Monica High School SANTA MONICA, CALIF. Santa Monica Unified School Dist., 1723 4 St., Santa Monica, Calif. BA 5/3. CD 4/11/61.

J. B. Sooy Constr. Co., c/o H. L. Arthur, San Jose-Los Gatos Rd., San Jose, Calif., CA $976,950, 1 story 31,000 sq. ft. each concrete block Hollenbeck and Bayside ELEMENTARY SCHOOLS, SUNNYVALE, CALIF., Sunnyvale School Dist., 656 E. Maude Ave., Sunnyvale, Calif. BA 4/12. CD 4/25/61, under LB

Oltman Constr. Co., 516 S. Monterey Pass Rd., Monterey Park, Calif., CA $841,000, masonry STORES, 21918-40 Hawthorne Blvd., TORRANCE, CALIF. Del Amo Estate Co., Union Bank Bldg., 325 W.8 St., Los Angeles 34, Calif.

Darex Diary

by Mel Prior

Member, American Concrete Institute

Technical Service Manager, Construction Chemicals

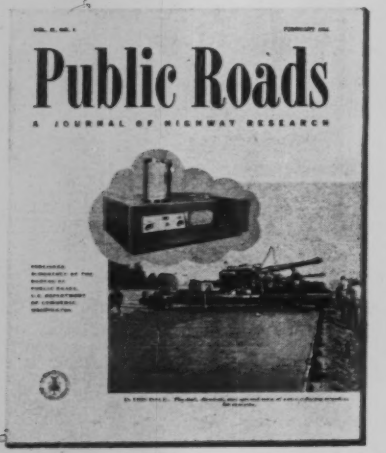
GRACE W. R. GRACE & CO./DEWEY AND ALMY CHEMICAL DIVISION

Cambridge 40, Mass. • Chicago 38, Ill. • San Leandro, Calif. • Montreal 32, Canada

(No. 21 of a series)

Bureau of Public Roads' Water-Reducing Retarder Report

BY COINCIDENCE, this issue of Darex Diary is number 21; same as the code number for Dewey and Almy's DARATARD in the Bureau of Public Roads' recently published study of water-reducing retarders.



The February, 1961 issue of Public Roads was devoted to physical, chemical and spectral tests of water-reducing retarders for concrete.

The members of the Bureau's Division of Physical Research are to be congratulated for planning, organizing, and conducting this series of tests, as well as for an excellent presentation of the test data. The work is a valuable contribution to the knowledge of admixture use in concrete, and an excellent guide for specification writers.

The twenty-five admixtures submitted for testing by the Bureau can be divided into three basic groups: Lignosulfonates, Organic Acids and Carbohydrates. It is interesting to note that these three groups had widely varying effects on the properties of the resultant concrete. Furthermore, individual admixtures within each group had significantly different effects on the properties of the admixtured concrete.

Retardation is the prime consideration in any specification for water-reducing retarders, and should be determined according to ASTM Designation C 403 before investigating other properties. The effect of the retarder on water reduction, strength, durability, and shrinkage of concrete should also be thoroughly investigated. These factors have a bearing on the over-all quality of the admixtured concrete and all should be considered by the specification writer.

In the Bureau's symposium, DARATARD placed easily within the requirements of the recommended specification for water-reducing retarders, and ranked high on the list among all admixtures tested. From a completely impartial standpoint, the Bureau's report points up the wide difference in lignins, with DARATARD being among those showing the most desirable properties. This underscores the important point that the results obtained with any one lignin should not be taken as indicative of the performance of all. The BPR specification offers a good basis for proper evaluation.

CANADA

BUILDINGS—LB & CA

▲ **Fluor Corp., Ltd.**, 2500 South Atlantic Blvd., Los Angeles, 22, Calif., U. S. A., CA Est. $3,000,000, design and construct 70,000,000 cu. ft. per day GAS PROCESSING PLANT near CARSTAIRS, ALTA. Carstairs' Operators' Committee, 207 Royalite Bldg., Calgary, Alta

▲ **Anglin-Norcross Western Ltd.**, 1157 Melville St., Vancouver, B. C., LB $1,836,602, (6 bidders), 3 story, concrete frame ERIC HAMBER SECONDARY SCHOOL, incl. one double gymnasium, auditorium, cafeteria, library, administration offices, etc., Oak and 33rd Sts., VANCOUVER, B. C. Vancouver School Dist. No. 39, 1595 West 10th, Vancouver, B. C. BA 4/26/61 CD 3/30/61.

LATIN AMERICA

BUILDINGS—LB & CA

▲ **Arthur G. McKee & Co.**, 2300 Chester Ave., Cleveland 14, O., U.S.A., CA Est. $50,000,000, design and construct 60,000 bbl REFINERY and PETROCHEMICAL PLANT, PORTOBELO, PANAMA. Golden Eagle Co. of Panama, (subsidiary Ultrmar Co., London, England), 420 Lexington Ave., New York, N. Y.

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, Zone 2, Contract No. 2, COMB. SEWERS 1.39 mi. Ainslite Ave. System, $800,000.
Contract No. 3, COMB. SEWERS, Blackhawk System 1.13 mi. Bosworth, Blackhawk to Division Sts., $1,750,000.
Contract No. 1, COMB. SEWERS, California System 1.31 mi., $2,000,000.
Contract No. 3D, COMB. SEWERS, Central South Side System, 86th, Ingleside to Cottage Grove Sts., $900,000.
Contract No. 4D, COMB. SEWERS, Kostner Ave. System 1.17 mi., $790,000.
Contract No. 2, COMB. SEWERS, Laflin Ave. System 2.1 mi. Chicago River to Cermak Rd., $3,180,000.
Contract No. 3, COMB. SEWERS, near South Side System 0.85 mi. Emerald to Parnell Sts., $1,000,000.

▲ **Me., Rumford**—City, City Hall, SEWAGE TREATMENT PLANT, SEWERAGE SYS. $1,254,000. Marchant & Minges, 1 Park Dr., Farmington, Conn., engrs. CD 4/10/61.

▲ **Mont., Billings**—City, City Hall, STORM SEWERS ranging up to 72 in. in diameter, West Billings. $2,000,000. William Purvis, city engr. CD 3/28/57.

▲ **O., Bridgeport**—Belmont Co. Sewer Auth. No. 1, Bridgeport, SEWERAGE SYSTEM, $5,180,000. Gannett, Fleming, Corddry & Carpenter, Inc., 600 N. 2nd St., Harrisburg, Pa., engrs. Bids in August or September. CD 4/17/61.

▲ **S. C., Spartanburg**—City, City Hall, R. B. Simms Filtration PLANT ADDN. and LINE EXTENSIONS. $1,300,000.

▲ **Tenn., Chattanooga**—City, City Hall, SEWAGE TREATMENT PLANT ADDN., N. Brainerd area, $2,000,000. Havens & Emerson, 233 Broadway, New York, N. Y., consult. engrs. Bids summer 1961. CD 4/8/60.

▲ **Va., Manassas**—Bd. Supervs. Prince William Co., Manassas, voted $1,000,000 bonds Apr. 25, WATERWORKS IMPRVTS., Dumfries-Triangle District. CD 4/5/61.

▲ **Wash., Milton**—Town, Town Hall, SEWERAGE SYSTEM. $1,300,000. CD 5/28/59.

BRIDGES

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, Zone 2,

VIADUCT, Halsted St. from Kinzie to Wayman Sts., $1,000,000; VIADUCTS and APPROACHES, Halsted-Chicago Ave. Intersection, $2,800,000. CD 6/10/57.

STREETS AND ROADS

▲ **New York and New Jersey**—Port of New York Auth., 111 8th Ave., New York 11, N. Y., WID'N., IMPRV. ROADWAY, Outerbridge Crossing, Tottenville-Perth Amboy. $3,620,000. Bids Summer 1961.

▲ **Tex., Angleton**—Brazoria County, Road Dist. No. 35, Courthouse, voted bonds Apr. 22, 15 mi. hard-paved ROAD, from Angleton to Monsanto Chemical Plant near Alvin, $850,000; general road imprvts. in Dist. 35, $250,000. CD 4/6/61.

▲ **Tex., Sansom Park Village (Br. Fort Worth)**—Village, City Hall, 5500 Buchanan, STREET, grading, drainage, paving, curb and gutter and storm drain, $1,000,000. Joe J. Rady, 1606 Cont. Life Bldg., Fort Worth, consult. engr.

EARTHWORK, WATERWAYS

▲ **Calif., San Luis Obispo**—San Luis Obispo County Flood Control & Water Conservation Dist., Court House, WATER TRANSMISSION LINE from Nacimiento Reservoir to San Miguel, Pasco Robles, Templeton, Atascadero, Santa Margaritea and San Luis Obispo with DAM and RESERVOIR at Pasco Robles Creek. $8,000,000. Robert H. Born, co. hydraulic engr. To go ahead 1962.

▲ **Ind., Indianapolis**—Bd. Flood Control, 202 N. Alabama St., Phase 2, White River-Fall Creek FLOOD CONTROL, LEVEES, CHANNEL WIDENING, White River from Belt R.R. tracks to 30th St. and along Fall Creek from 16th St. to Indianapolis Water Co. Canal. $4,000,000. Bids late Summer 1961.

AIRPORTS

▲ **Conn., New Haven**—State P. Wks. Dpt., 165 Capitol Ave., Hartford, 5,100 ft. Crosswind RUNWAY, New Haven Airport, $2,000,000. CD 5/9/49.

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, Zone 2,
TERMINAL Addn., $2,500,000.
F.A.A. CONTROL TOWER, $500,000.
converting 27R-9L RUNWAY TO TAXIWAY, SEWERS, $202,000.
replacing APRON, Terminal area, $128,000.
OVERLAY 27R-9L CENTER as TAXIWAY, $103,000.
RUNWAYS and TAXIWAYS, high speed turnoff triangle, lighting, $102,000.
OVERLAY RUNWAY 27L-9R, $152,000.
reconstr. with concrete ends of RUNWAYS 22L, 31L, 13R, $430,000.
concrete PLANE LANDING and RUNUP AREA, 27R-9L, East End, lighting, $484,000, all foregoing at Midway Airport. CD 9/28/56.

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, Zone 2, AIRPLANE PARKING AREA, Extension No. 1, $1,594,000; renovating CONTROL TOWER, Meigs Airport, $150,000. CD 9/28/56.

UNCLASSIFIED

▲ **N. Y., Flushing**—Pavilion of American Interior, Inc., 134 Lexington Ave., plans by T. H. Yardley, 1758 Newfield Ave., Stamford, Conn., 3 story, 68,000 sq. ft. PAVILION of AMERICAN INTERIORS, furniture and home furnishings exhibit, World's Fair. $1,448,000.

PUBLIC BUILDINGS

▲ **Ark., El Dorado**—El Dorado School Dist., El Dorado, plans by Ginocchio, Cromwell, Carter, Dees & Neyland, 416 Center St., Little Rock, 2 JUNIOR HIGH SCHOOLS and 2 HIGH SCHOOLS. $3,000,000. CD 12/13/60.

▲ **Calif., Cupertino**—Cupertino Union Elementary School Dist., 10300 Vista Dr., voted $7,500,000 bonds Apr. 18, SCHOOLS. CD 3/1/61.

▲ **Colo., Aurora**—School Dist. 28J, Adams and Arapahoe Counties, 11th and Peoria, voted $3,000,000 bonds May 1, SCHOOLS. CD 2/23/61.

▲ **Colo., Rocky Ford**—Otero County School Dist. 3, Rocky Ford, $1,280,000 bond election May 29, 2 story, 75,000 sq. ft. brick, steel glass HIGH SCHOOL, $1,090,000, Paul E. Pierson, 285 University Blvd., Denver, Colo., and Caudill, Rowlett & Scott, 3400 Montrose Houston Tex. archts.

▲ **Conn., Waterbury**—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Louis R. Fucito, 37 Hillside Ave., REGIONAL TECHNICAL INSTITUTE, off Chase Parkway, Proj. BI-R-186, $1,000,000. Hill & Harrigan, 909 Whalley Ave., New Haven, consult. engrs. CD 12/15/60.

▲ **Conn., Waterbury**—Town, Bd. Educ., 271 E. Main St., plans by Louis R. Fucito, 27 Hillside Ave., HIGH SCHOOL, $1,000,000. Howard, Needles, Tammen & Bergendoff, 99 Church St., New York, N. Y., consult. engrs. CD 4/24/61.

▲ **Ill., Chicago**—Bd. Comrs. Cook Co., County Bldg., Zone 2, remodeling FANTUS CLINIC, 1850 W. Harrison St. $600,000; DENTAL and MENTAL CLINICS, Audy Home, Roosevelt and Leavitt Sts., $1,700,000. CD 6/11/57.

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, Zone 2, North Cell House, HOUSE OF CORRECTION. $1,000,000. CD 6/11/57.

▲ **Mass., Burlington**—Town, Supt. Schools, Center St., plans by Edward J. Tedesco, 15 Pleasant St., Woburn, ELEMENTARY SCHOOL, Wilmington Rd. and Mill St. Area. $1,000,000. Bids Aug. 1961. CD 7/29/60.

(Continued on page 186)

Pedestrian overpass, Palmetto Expressway, Miami, Florida.

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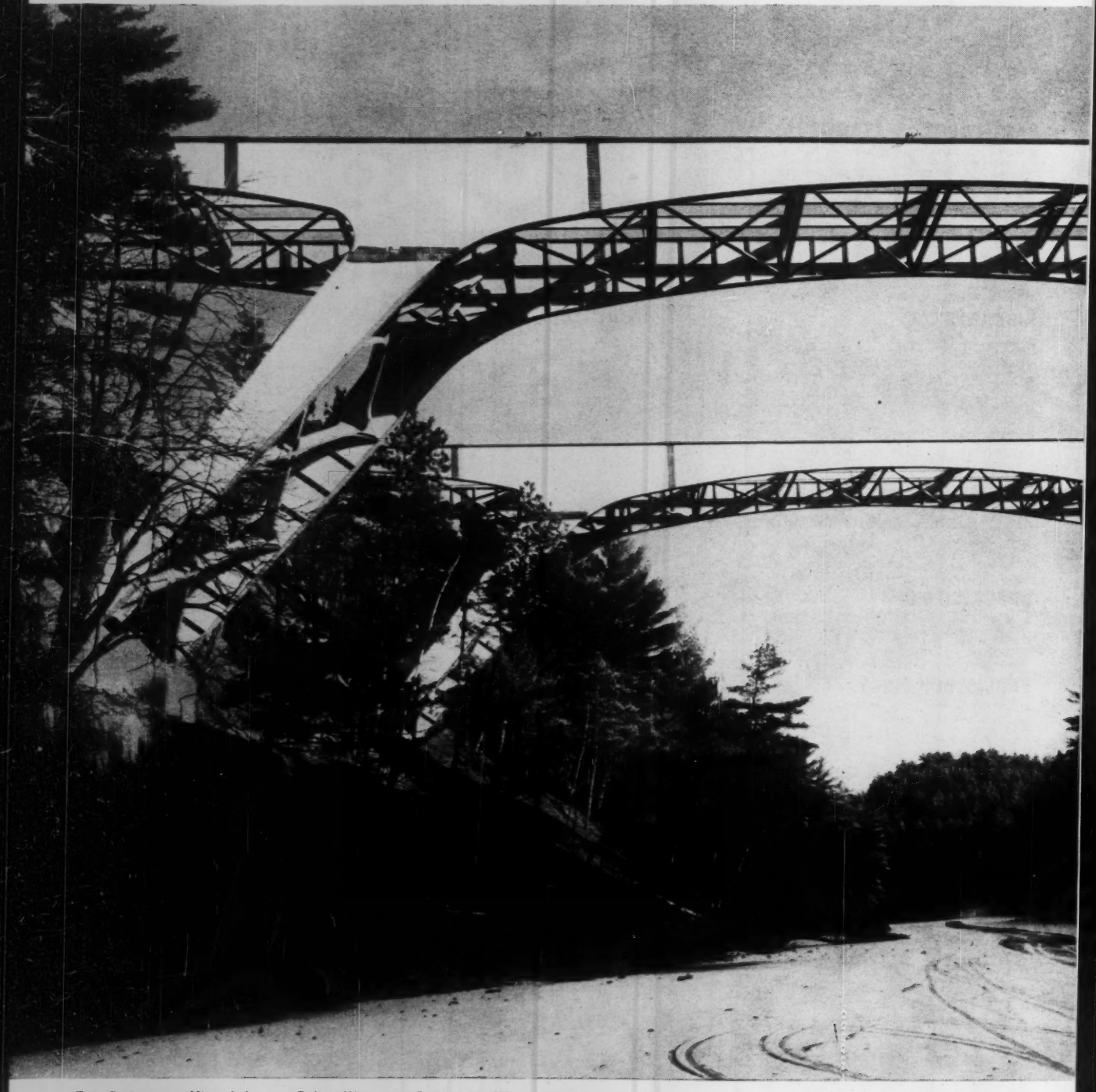
How would you have erected these



Twin Bridges over Mirror Lake, near Delton, Wisconsin. Designed by Wisconsin Highway Commission, H. B. Schultz, Bridge Engineer. General Contractor: L. G. Arnold, Inc., Eau Claire, Wisconsin.

American Bridge Division of United States Steel

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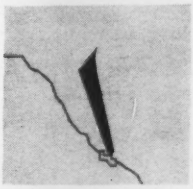
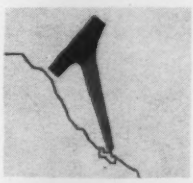
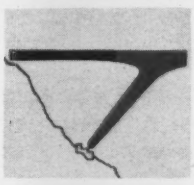


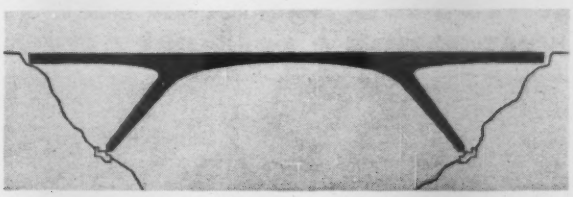
1. First, a column was attached to its abutment and raised into a vertical position.



2. The haunch girder section was then lowered into place and fastened.



3. The whole section was rotated into position and the final girder set into place. The leg and span were then self supporting. This operation was repeated from both sides until all legs and end spans were in place.



4. Center spans were then slid down the embankment and hoisted into place.

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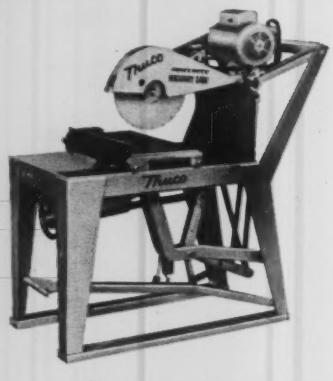

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(Continued from page 183)

▲ **N. J., Bayville**—Ocean County Regional High School Dist., Bayville, plans by Ernest Thornell Brown, 7 Watchung Ave., Plainfield, JUNIOR HIGH SCHOOL. $1,860,000. Saul Shaw & Co., 24 Commerce St., Newark, consult. engrs. Bids in early Summer. CD 2/10/61.

▲ **N. J., Englewood**—Housing Auth., City of Englewood, Municipal Bldg., Palisade Ave., plans by Kelly & Gruzen, 60 Park Pl., Newark, 100-unit HOUSING. $1,000,000. CD 2/2/61.

▲ **N. J., Waldwick**—Bd. Educ. Borough Waldwick, West Prospect St., referendum bonds and project June 6, JUNIOR-SENIOR HIGH SCHOOL. $2,918,000. Perkins & Will, 55 Church St., White Plains, N. Y., archts. CD 7/9/59.

▲ **N. J., Woodbridge**—Bd. Educ., Twp. Woodbridge, Baron Ave., referendum bonds and project June 6, SENIOR HIGH SCHOOL, Iselin, $3,000,000, Wiedersum Assoc., 65 Roosevelt Ave., Valley Stream, N. Y., archts.; HIGH SCHOOL ADDN., $500,000, Merchant Seidel & Hickey, 1 Elm Row, New Brunswick, archts. CD 1/17/61.

▲ **N. Y., North Merrick**—Mepham Central High School Dist. No. 3, Short Pl., voted $2,545,000 referendum Apr. 26, 3 story HIGH SCHOOL ADDN., Bellmore. F. P. Widersum Assocs., 65 Roosevelt Ave., Valley Stream, archts. CD 4/12/61.

▲ **N. Y., Sea Cliff**—Bd. Educ. North Shore Schools, 112 Franklin Ave., plans by Perkins & Will, 55 Church St., White Plains, N. Y., 65,000 sq. ft. JUNIOR HIGH SCHOOL ADDN., Kissam Lane School Site, Glen Cove Ave., Glen Head. $1,725,000. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York 17, N. Y., struct. engrs. Segner & Dalton, 55 Church St., White Plains, N. Y., mech. engrs. (Correction—owner). Bids June 1961. CD 1/19/61, under N. Y., Glen Head.

▲ **N. Y., Yonkers**—Yonkers Municipal Housing Auth., Bldg. 8, Schlobohm Houses, plans by R. S. Krinsky & Assocs., 20 S. Broadway, Yonkers, N. Y., 300 unit public HOUSING, Garden St. off Palisades Ave. Over $3,000,000. CD 1/30/61.

▲ **O., Bryan**—City, City Hall, municipal POWER PLANT ADDN., incl. generating unit, $1,400,000. Emery, Marker & Campbell, Toledo Trust Bldg., Toledo, engr. Bids in June. CD 11/28/60.

▲ **O., Dayton**—Bd. Comrs. Montgomery County, Courthouse, one-mill levy Nov. 7, COURTHOUSE. $5,000,000. Freeman A. Pretzinger, Reibold Bldg., Dayton, and Lorenz & Williams, 2600 Far Hills, Dayton, assoc. archts. CD 12/2/60.

▲ **Utah, Ogden**—Weber County School Dist., 1124 Washington Blvd., voted $3,200,000 bonds Apr. 25, SENIOR HIGH SCHOOL. CD 4/5/61.

▲ **Va., Richmond**—Henrico County School Bd., 21st and Main Sts., plans by J. Henley Walker, 200-A East Cary St., HIGH SCHOOL III, Azalea and Parham Aves. $1,900,000. CD 6/23/60.

▲ **Ont., London**—Bd. Educ., 3rd Fl., City Hall, plans by R. D. Schoales, 375 Maitland St., 3 story, brick, masonry steel Beal Technical School WING EXTENSION, King St. $1,100,000. C. C. Parker & Assocs., Ltd., 572 Dundas St., consult. engrs.

▲ **Ont., Newmarket**—York County Hospital, 596 Davis Drive, plans by Somerville, McMurrich & Oxley, 191 Eglinton Ave. E., Toronto, HOSPITAL WING. Over $1,000,000. Bids end of 1961.

COMMERCIAL BUILDINGS

▲ **Calif., Los Gatos**—Sisters of Charity of the Blessed Virgin Mary, c/o Mother Mary Consolatories, Mount Carmel, Dubuque, Iowa, plans by Gaul & Voosen, 165 E. Erie St., Chicago 11, Ill., NOVITIATE, 57 acre site, Foster Ave. $2,500,000. Completion expected Mid-1962.

▲ **Calif., Novato**—Fifty Associates Real Estate Trust & Luigi Demartini Trust, 243 Kearny St., San Francisco, plans by Wurster, Bernardi & Emmons, 202 Green St., San Francisco, Novato Plaza SHOPPING CENTER, 11½ acres. $1,500,000.

▲ **Calif., San Francisco**—National Braemar, Inc., Developer, 1160 S. Beverly Dr., Los Angeles, Calif., plans by Minoru Yamasaki & Assoc., Birmingham, Mich., Van Bourg & Nakamura & Assoc., Claremont Hotel, Berkeley, Calif., JAPANESE CULTURAL AND TRADE CENTER, Western Addition to incl. 100 STORES, RESTAURANT, 1000 seat THEATRE, 14 story TOWER HOTEL, PARKING, EXHIBIT HALL, PEACE PAVILION with Pogoda of Peace. $10,000,000. Takanaka & Assoc., Tokyo, Japan, archt. (theatre). Worthington Skilling, Helle & Jackson, Washington Bldg., Seattle, Wash., consult. engrs. Ground breaking end 1961.

▲ **Calif., Santa Rosa**—SRG Corp., 420 Market St., San Francisco, plans by Dudley F. Wynkoop, 130 Geary St., San Francisco, 2 story frame and 4 story steel framed Santa Rosa Gardens APARTMENTS. $1,700,000.

▲ **Conn., Brookfield Center**—Goodfellow-Ashmore, Inc., 31 West St., Danbury, 40 HOUSES, Whisconier Ridge, Rte. 25. $1,580,000.

▲ **D. C., Wash.**—Harvard University, 1703 32nd St., N. W., plans by Corning, Moore, Elmore & Fischer, 1302 18th St. N. W., 2 story, concrete, RESEARCH LIBRARY and MUSEUM, $1,000,000.

▲ **Fla., Boca Raton**—University Shopping Center, c/o Harold Funt, 4646 NW 183rd St., (Miami Shopping Center), Miami, plans by Donald J. Reiff, 1185 71st St., Miami Beach. 1st Phase, University SHOPPING PLAZA, $1,500,000. (Correction—owners address). CD 4/6/61. Bids Fall 1961.

▲ **Fla., Eau Gallie**—Milton W. Pepper, c/o Robert L. Grundman, archt., 2521 34th St. S., St. Petersburg, 120,000 sq. ft. SHOPPING CENTER, $1,000,000. Dick Abrams, 2521 34th St. S., St. Petersburg, Fla.,

(Continued on page 192)

ALPHA

BETTER CONSTRUCTION THROUGH
BETTER USE OF CEMENTS

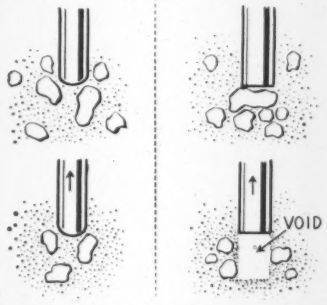
news and notes from the field

Test Cylinders Made Right—Give Right Answers

The concrete test cylinder is the most commonly used test for concrete strength. It is a reliable test *only* if made according to standard procedure, which has been outlined in a previous issue of Alpha's "News and Notes From The Field." Now, let's take the negative approach and list the main factors that can cause your concrete test cylinders to give you the *wrong* results.

1. Not Using Proper Rods

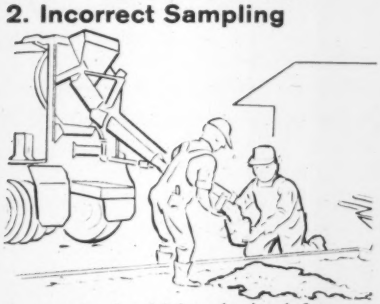
A ⅝" rod with a hemispherical tip does the job best and is the only rod recommended. Do not use a piece of reinforcing steel just because it's handy.



The hemispherical-nose rod is best because it slides over the aggregates instead of pushing them. When it is withdrawn, concrete closes smoothly after it.

A flat-nose rod is inefficient because it cannot slip through the aggregates, but forces them downward, and gives the same effect as segregation. A flat-nose rod also is apt to leave voids as it is withdrawn as shown above at right.

2. Incorrect Sampling



A sample should be obtained from at least 3 parts of the load, and taken directly from the truck or mixer discharge. Before filling the molds, the individual portions of the sample should be thoroughly re-mixed in a large flat pan, wheelbarrow or on some clean, non-absorptive surface.

3. Insufficient Rodding

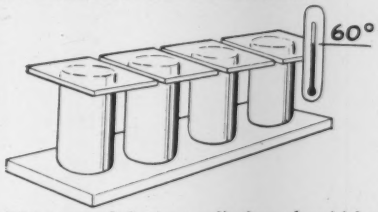
Fill each mold ⅓ full of the concrete sample and rod each a total of 25 times, over the entire surface.

Fill each mold ⅔ full and rod each 25 times, over the entire surface, being careful not to extend rod deeply into lower layer.

Overfill cylinder slightly and rod top layer 25 times. Penetrate but do not go through second layer. Rod evenly over entire surface.

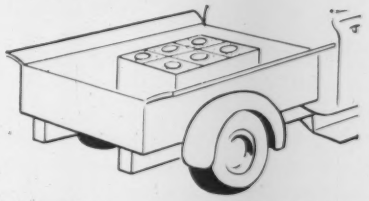
To close any voids left by rodding, tap cylinders lightly all around. After the top layer has been rodded, the surface of the concrete should be struck off with a trowel.

4. Insufficient Protection



The tops of the test cylinders should be covered with glass plates, oiled paper, wet burlap or a similar material to prevent the loss of moisture. Store cylinders where the temperature stays between 60°F. and 80°F. When cylinders are ignored for several days at higher or lower temperatures, results will be erratic. After casting, cylinders should be left undisturbed for 24 hours until they can withstand handling.

5. Careless Handling and Curing

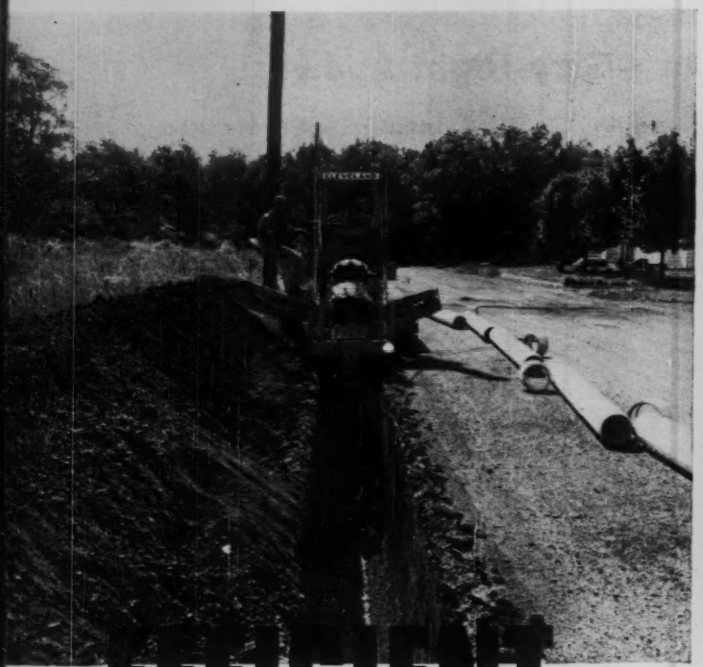


Test cylinders should not be subject to any movement or vibration for a period of 24 hours. They are then placed in curing box for moist curing at 70° or transferred to a laboratory curing room. Test cylinders can still suffer considerable damage if they are not carefully packed or cushioned for transit.

Reprints of this information may be had at no cost. For technical assistance in making and checking cylinder tests, contact the Alpha representative in your area.

ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.

NOTHING DIGS TRENCH



EFFICIENT

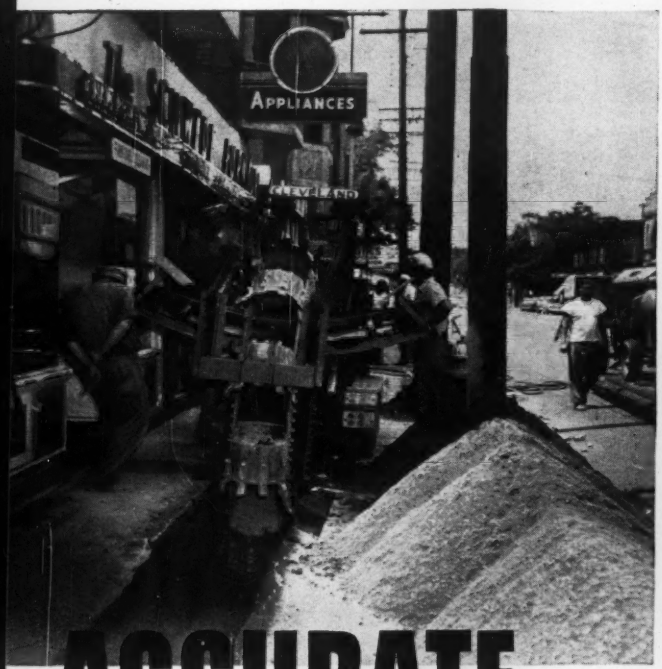
No other type of excavating machine approaches the modern, full-crawler-mounted, wheel-type trencher in trench digging efficiency. This Cleveland 110, for example, dug 500% more trench per day than the other-type excavating machine it replaced on the 11,000-foot utilities job shown above. No excavating machine but the trencher is designed especially for trench digging. No other-type excavator cuts trench to such accuracy of line, width and grade—minimizing dirt handling, finishing and restoration costs. Only Cleveland-type trenchers fine the spoil and place it for fast, simple, low-cost backfilling. Dig trench more economically under all job conditions—save money on trench jobs of all kinds, from 8 to 52 inches wide, down to 8½ feet deep—with an efficient Cleveland Trencher.

TOUGH

Take another look at that spoil bank. That's hard shale and rock-digging, right down to trench bottom. Piling up that spoil at a 4-foot-a-minute clip is a tough Cleveland J-40. Full-crawler, wheel-type trenchers have no equal for trench production in hard digging. Simultaneous wheel rotation and crawler progress result in forward crowd of the wheel into the work with maximum utilization of power at the point of digging. Higher wheel-speeds in relation to crawler-travel produce a fast-biting milling action that is most effective for digging shale, frost and similar conditions. Slower speeds produce powerful bites that chew out caliche, hardpan, coral and other hard formations. Don't let tough digging hold down your production—make your entire job *move* with a tough-digging Cleveland Trencher.

Investigate now the profit potential of a modern trencher —an efficient, tough, accurate, productive Cleveland Trencher

LIKE A TRENCHER



ACCURATE

Look again at this picture. The Cleveland is digging in the middle of a sidewalk in a commercial area, working within inches of plate glass windows, hydrants, poles, etc. No other excavator approaches the accuracy of a full-crawler-mounted, wheel-type trencher in conditions like this. No other excavator digs to such accuracy of line, width and grade—no deeper or wider than necessary. This precision saves costly cubic yards of sand, gravel or other backfill, minimizes repaving expense, eliminates all excess spoil handling. Cleveland-type trenchers safely dig trench within a few inches of walls, poles, trees, etc. and flush with curbs, pavement and other surface obstructions. Accurate-digging Cleveland Trenchers save time and money on all types of trenching jobs.

PRODUCTIVE

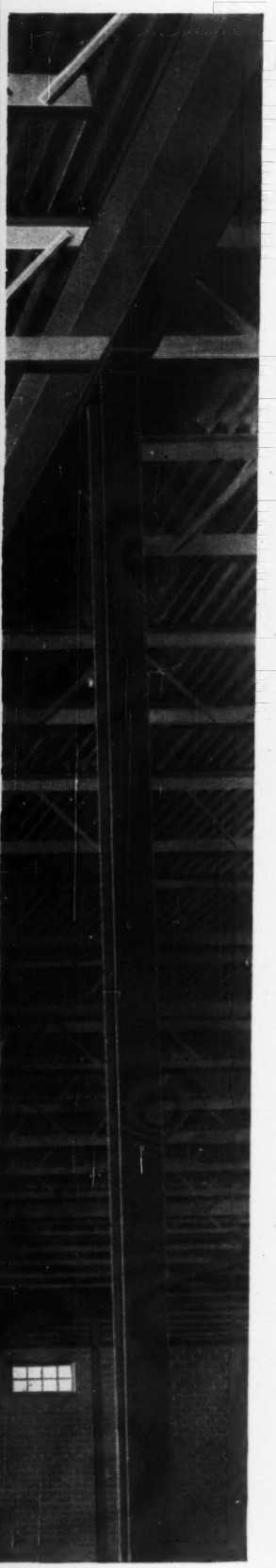
This Cleveland can dig well over two miles of wide deep trench in a 10-hour day. For fast, low-cost trench production like this no other type of excavating machine compares with the modern wheel-type trencher —the trencher originated and perfected by Cleveland. Other-type excavators use stop-and-go, interrupted-cycle digging action suitable for other types of excavating work. The trencher's digging action is *continuous* and all its operations are *simultaneous* . . . it travels . . . it digs and grades...it fines, elevates, conveys and deposits spoil ready for fast low-cost backfilling. Because it is designed especially for this specialized excavating work it has no equal for maximum trench production at lowest cost. Make your entire job *move*—dig more trench with a fast, productive Cleveland Trencher.

CLEVELAND TRENCHER

THE CLEVELAND TRENCHER CO., 20100 ST. CLAIR AVE., CLEVELAND 17, OHIO

TENSILFORM® BY WHEELING

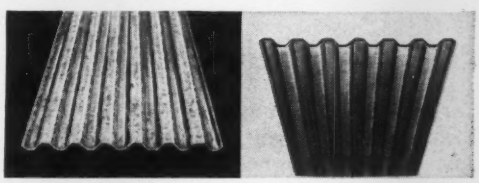
Tensilform complies fully with American Iron and Steel Institute's Design Manual for Light Gauge Structural Shapes (1960 Edition).



Big, wide, wonderful open space!

There's a light, airy look about buildings that have roofs of Tensilform and lightweight aggregate fill.

That's because exceptionally strong Wheeling Tensilform permits fewer, lighter roof supports . . . and Wheeling's *all-new* design provides excellent lateral stability for all types of structures.



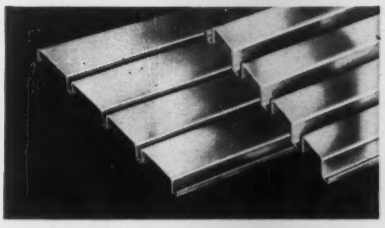
USE TENSILFORM AS A CEILING, TOO! The long, angular lines of Tensilform make nearly any building look more expansive.

More than that, galvanized Wheeling Tensilform, combined with either conventional or light aggregate concrete, gives you roofs with:

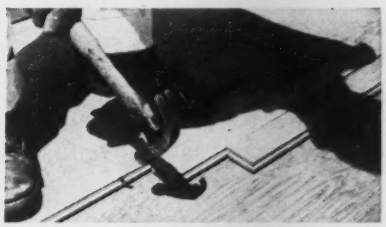
- Excellent "U" factors at low initial costs.
- Lower fire and extended coverage ratings.
- Earlier occupancy because shoring isn't needed . . . and Tensilform can be installed even in freezing weather.
- Cleaner construction because precision-formed Tensilform cuts cement seepage at *both* lateral and end joints.

Get the full story on Wheeling Tensilform for roof and floor slabs from our catalog in Sweet's. Or write to the Wheeling Corrugating Company, Wheeling, W. Va.

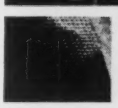
WHEELING PRODUCTS INCLUDE:



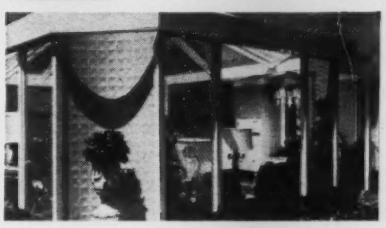
STEEL ROOF DECK — For use with conventional built-up roofs. Like Tensilform, Wheeling Steel Roof Deck goes on fast in all weather . . . can be field-painted the color you specify. Made of Cop-R-Loy® steel for extra-long life.



LABELLE CUT FLOORING NAILS — Unexcelled for laying tight, quiet hardwood floors because the nail corners cut wood fibers . . . make them work like fish-hook barbs.



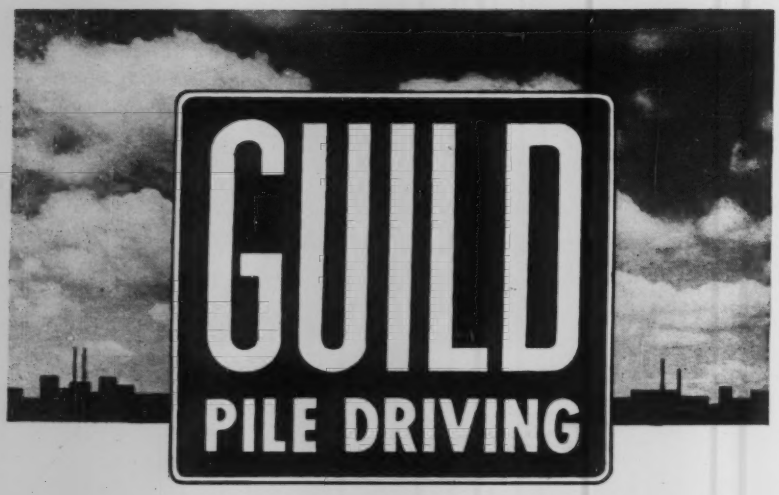
METAL LATH — A complete line of expanded metal laths and lath accessories for all plaster applications.



EXPANDED METAL — Stronger than the steel from which it's made, Wheeling Expanded Metal is widely used as a decorative material . . . and wherever free passage of light, air, heat or liquids is required.

WHEELING CORRUGATING COMPANY · IT'S WHEELING STEEL!

Immediate delivery on all stocked items from these warehouses: *Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis, New York, Philadelphia, Richmond, St. Louis.* Sales Offices: *Atlanta, Houston, New Orleans.*



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39 REMOTE CONTROLLED **HYDRAULIC JACKS & PULLERS** TO CHOOSE FROM

WRITE FOR CAT. H-60

PUMPS AND RAMS (Center hole or solid) 10 TO 300 TONS CAPACITY Pre-stress concrete; pull gears, sleeves, wheels, etc.; lift, push and pull heavy loads.

SIMPLEX RE-MO-TROL UTIL-A-TOOL JACKS JENNY ROL-TOE

TEMPLETON, KENLY & CO. 2553 Gardner Road Broadview, Illinois

ALWAYS USE POSTAL ZONE NUMBERS

Without the zone number addresses are incomplete in 106 U. S. cities.

(Continued from page 186)

struct. engr. Case Engineers, 2521 34th St. S., St. Petersburg, Fla., mech. engr.

▲ **Fla., Miami**—Flagler Federal Savings & Loan Assn. of Miami, 100 NE 2nd Ave., plans by Alfred B. Parker, 2921 SW 27th Ave., 5 story BANK, NE 1st St. and 1st Ave. **$1,100,000.** Dignum Assocs., 260 Palermo Ave., Coral Gables, consult. engrs.

▲ **Fla., Miami**—Mahi Shrine, 1500 NW North River Dr., 6 APARTMENTS FOR RETIREES, SWIMMING POOL, 1500 NW North River Dr., **$5,000,000.**

▲ **Ill., Chicago**—Presbyterian St. Lukes Hospital, 1753 West Congress St., plans by Skidmore, Owings & Merrill, 30 West Monroe St., Zone 3, HOSPITAL, South Center Out-Patient bldg., Harrison and Hermitage Sts. **$2,000,000.** Bids in June. CD 10/8/56.

▲ **Minn., Minneapolis**—Farmers & Mechanics Savings Bank of Minneapolis, 90 South Sixth St., 6 story BANK ADDN. atop existing 5 story wing. **$4,000,000.** Work to begin soon.

▲ **Mo., Liberty**—William Jewell College, 4 level LIBRARY. **$1,000,000.** CD 10/31/55.

▲ **Mont., Butte**—St. James Community Hospital, Silver and Idaho Sts., plans by Cushing, Terrell & Associated Archts., 1333 Airport Rd., Billings, 6 story HOSPITAL ADDN. **$2,500,000.** Bids in Fall.

▲ **N. J., Flemington**—Hunterdon Assocs., Inc., c/o Harold D. Glucksman, archt., 850 Broad St., Newark, 150,000 sq. ft. DISCOUNT CENTER, Rtes. 202 and 69, Flemington Traffic Circle, Raritan Twp. **$2,000,000.**

▲ **N. J., Haddonfield**—Roman Catholic Diocese of Camden, 721 Cooper St., Camden, plans by Dante J. D'Anastasio, 1815 Federal St., Camden, HIGH SCHOOL and FACULTY BLDG. Over **$1,500,000.** Bids in Summer.

▲ **N. J., Moorestown**—John Wanamaker, City Hall Square, Phila., Pa., plans by Young & Banwell, 704 Delaware Ave., Wilmington, Del., DEPARTMENT STORE. **$2,500,000.** Lambert, McGee & Costello, Inc., 1629 Chestnut St., Phila., Pa., consult. engr. Bids in Summer-Fall. CD 4/12/61.

▲ **N. J., Princeton**—Princeton University, Princeton, plans by Fisher-Nes Campbell & Assocs., 2120 North Charles St., Baltimore, Md., ARCHITECTURAL BLDG. **$1,500,000.** Meyer-Strong & Jones, 230 Park Ave., New York, N. Y., consult. engrs. CD 4/17/61.

▲ **N. Y., Buffalo**—560 Delaware Ave., Inc., 560 Delaware Ave, Buffalo, 3 story, 45,000 sq. ft. steel frame, brick, glass OFFICE. **$1,000,000.** Bids 1961.

▲ **N. Y., New York**—Glickman Corp., 565 5 Ave., New York, Zone 17, plans by William Lescaze, 211 E. 48 St., New York, Zone 17, 23 story, 10,000 sq. ft. 62 x 162 ft. OFFICE southeast corner Broadway and Fulton St. **$5,000,000.** Robt. Rosenwasser, 375 5 Ave., New York 16, N. Y., struct. engr. Al Kleinberger, 551 5 Ave., New York 17, N. Y., elec. engr. Rutherford Stinard, 801 2 Ave., New York 17, N. Y., engr. air-conditioning and plumbing. CD 1/30/61.

▲ **N. Y., New York**—Yeshiva University, 110 W. 57 St., Zone 19, plans by Kiesler & Bartos, 432 Park Ave. South, Zone 16, 10 story, 12-sided 169,000 sq. ft. RESEARCH; Morris Park Ave. and Newport Ave., Albert Einstein College of Medicine Campus. Over **$4,000,000.** Strobel & Rongved, 70 W. 40 St., Zone 18, struc. engrs. Frank Sullivan, 41 E. 42 St., Zone 17, mech. and elec. engr. To go ahead later 1961. CD 6/27/51.

▲ **N. Y., Rochester**—University of Rochester, River Rd., plans by Waasdorp, Northrup & Kaelber, 740 East Ave., 10 story, 55 x 110 ft. two CO-EDUCATIONAL DORMITORIES, River Campus. **$4,000,000.** Bids about Aug. 1. CD 5/1/61.

▲ **N. Y., Roosevelt**—Roosevelt Raceway, Inc., Roosevelt Raceway, Westbury, plans by Charles Luckman Assocs., 680 5 Ave., New York, Zone 19, DEPARTMENT STORE, Old Country Rd. **$1,000,000.** Fred S. Dubin Assocs., 178 S. Whitney St., Hartford 5, Conn., consult. engrs. Ohrbach's Department Store, 5 W.34 St., New York, N.Y., lessee. CD 11/17/59, under Ohrbach's Department Store, as owner.

▲ **N. Y., Southampton**—Southampton Hospital Assn., Herrick Rd., plans by York & Sawyer, 230 Park Ave., New York, Zone 17, 2 story HOSPITAL ADDN., ALTERATIONS at site. **$2,000,000.** Contr Spring 1962.

▲ **N. C., Charlotte**—Methodist Home, 3420 Shamrock Dr., plans by Louis H. Asbury & Associates, 121 Brevard Court, 4 story, 115,000 sq. ft., HEALTH CENTER. **$1,525,716.** S. J. Newton, 121 E. 3rd St., consult. engr. John Bolen, 109 W. 3rd St., mech. engr. CD 10/26/60.

▲ **O., Akron**—City Corp., Ohio Bldg., SHOPPING CENTER, 9 acre site facing W. Exchange St. at Beck Ave. **$1,000,000.**

▲ **O., Cincinnati**—Emery Realty Inc., Carew Tower, 25 to 30 story, glass, aluminum OFFICE, underground and overhead parking, 6th and Walnut Sts. **$9,000,000.** Bids in 1965.

▲ **O., Toledo** — Willys Diagnostic Clinic, UAW-CIO, W. Woodruff St., plans by G. G. Albanese, 5703 Main St., Sylvania, HOME FOR RETIREES, GARAGES, Irving St. between Ashland and Horton St. **$7,000,000-$8,000,000;** 5 story, 200-bed HOSPITAL, Woodruff St., adjacent to Diagnostic Clinic, **$3,000,000.** CD 10/27/60.

▲ **R. I., Providence**—Brown University, Pembroke College, 172 Meeting St., plans by Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, Mass., DORMITORY and DINING HALL, Pembroke College, **$1,400,000.** CD 2/18/58.

▲ **Tenn., Bristol**—Dave Cutshaw & F. A. Martin, 312 Sullivan St., Kingsport, plans by Frank Martin & Associates, 312 Sullivan St., Kingsport, MOTOR HOTEL, **$1,000,000.**

(Continued on page 201)

CATERPILLAR REPORTS

On the following pages:

Wheel Tractors on Trial

Heavy-footed Operators Wanted

How to Buy a Used Machine

What Size Machine for You?

Special Report on Custom Track Service

Wheel Loader Does a Crawler's Job

Power shift 630 and 631... nine speeds with the evidence is in ...you be the judge

For six weeks the powerful new Cat 630 and 631 wheel Tractors were on trial before the toughest jury in the construction business. These new power shift machines and the straight shift DW21 were put through their paces before 1300 contractors who gathered to see for themselves if these units lived up to their promise.

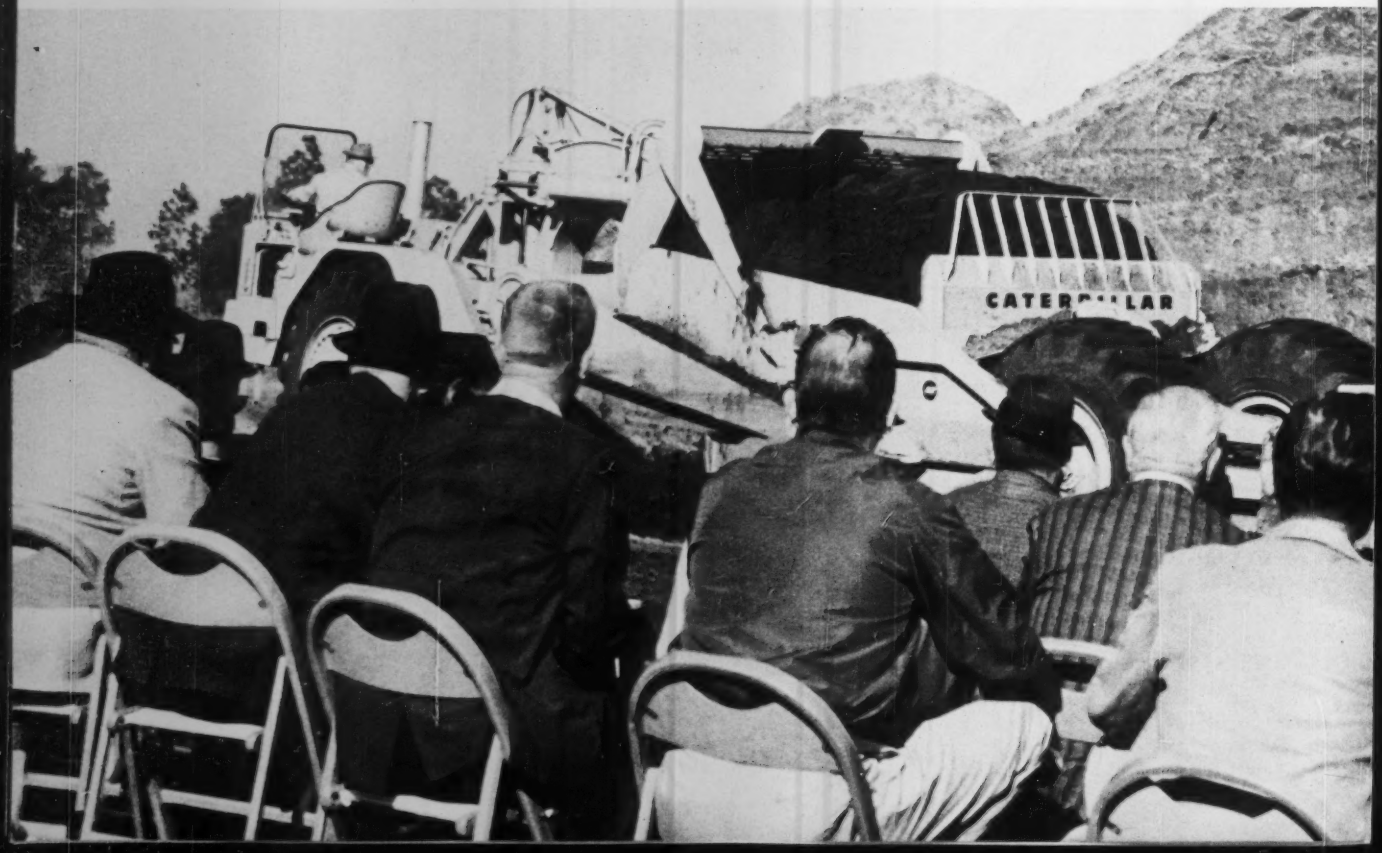
Now the evidence from that demonstration is in. Electronic scales and stop watches wrote the story in ledger-book terms. The facts are here for you to judge.

The three machines worked in sandy loam on a 1500-foot haul under identical conditions. They hauled more than 240 loads. The Cat power shift transmission proved how it automatically adapts machine power to job conditions and thus boosts production. In the demonstration, it helped the 631 move 18% more dirt than the DW21—*and* at the DW21's low cost per yard—the lowest in the business. Complete data are listed in the table on the next page.

POWER AUTOMATICALLY MATCHED TO THE JOB

Contractors who watched the new 631 and three-axle 630 got a new feel for the things that contribute to production. A new 420 HP Cat Engine provides the power for these rigs that have a heaped capacity of 28 cu. yd. (The 630 when used with 482C Scraper handles 35 cu. yd. heaped.) But capacity and power are only part of the reason for their superior performance. Even more important is a totally new concept in power shift transmissions. The 630 and 631 *automatically* adjust themselves to underfoot conditions thus providing top usable speed at all times. With a single lever the operator can make three shifts that result in nine speeds. And a shift indicator tells him when to shift!

In each speed range selected by the operator, the transmission provides three automatic shifts. Thus, by moving the lever to first range, the new 630 or 631 leaves the cut in torque divider drive—25% of engine torque being multiplied by a converter before joining the 75% of torque that is transmitted directly to the range transmission. As speed increases, the transmission automatically shifts to direct drive, then to overdrive for the most efficient use of power and for maximum speed. The same cycle is repeated in each speed range and downshifting is also automatic.



three shifts, boost production

This new Cat power shift makes these machines so easy to operate that the demonstration, though it proved their superiority, does not indicate the full advantage you'll get on the job. Contractors who operated the machines were pleasantly surprised with the easy shift. They could feel the unit shift, could see each shift on the shift indicator but all shifting, up or down, was smooth and quick. From a dead stop, the machines were automatically shifting out of torque divider drive in about 15 feet; were in overdrive in less than 100 feet and showing the operator when to change to second range. Most of the contractors soon realized that this job matching ability of the 630 and 631 was going to pay off in perhaps a less spectacular way. They realized that here were machines whose production would not be greatly affected by the time of day. Operators don't tire nearly as much and would still be moving the machines at the most efficient maximum speed at the end of a shift as well as at the start. Although the production shown in the demonstration was good, you could expect even better results on your own job when results were checked at the end of a full day or the end of a week.

FAST, EASY OPERATION

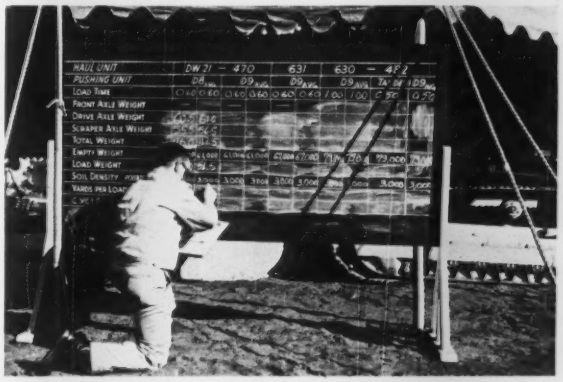
There are other ways, too, in which these new Cat machines make it easier for an operator to maintain top production. Cable controls are air actuated and take only half the effort to operate as formerly. Trying the machines themselves, the contractors found

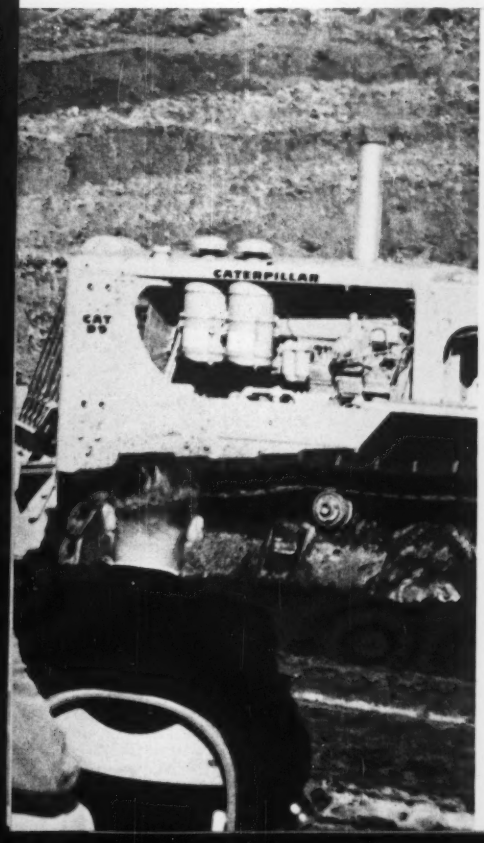
(continued on next page)

HERE ARE THE FACTS

Material:	Sandy loam, 3000 pounds per bank cubic yard			
Conditions:	Haul road firm			
Distances and Grades:	Haul, 750 feet, 2% favorable grade Return, 750 feet, 2% adverse grade			
Tractor-Scraper:	DW21	631	630-482	630-482
Pusher:	D9	D9	1 D9	Tandem D9s
Ave. Load Time:	0.60	0.60	1.00	0.50
Ave. Load:	20.8	22.8	26.3	28.1
Ave. Cycle:	2.1	1.95	2.45	2.0

These are cumulative, based on 16 demonstrations. The Caterpillar 630 Tractor-Scraper, and the DW20 Tractor, a straight shift machine, were not included in the demonstrations.





COMMENTS FROM A TOUGH JURY

Q: What impressed you the most about the 630 and 631?

George H. Langenfelder, Pres., C. J. Langenfelder & Son, Inc., Baltimore, Md.: "When other big machines hit tough spots, they bog down because the operators cannot shift fast enough. The 630 and 631 automatically shift to meet job conditions. They should roll right on through and help keep production high."

Hugh Steele, Pres., Hugh Steele, Inc., Atlanta, Ga.: "These machines look much stronger, bigger and faster. The air-actuated cable control should cut down on wear because it is either in or out. The steering looks like a big improvement, too, because it is simpler and more rugged."

C. D. Missimer, Job Supt., Albert Bros. Contractors Inc., Salem, Va.: "They ride better than anything I've ever been on. It's just natural if you keep an operator comfortable and happy, he'll be able to produce better. Not only do they go faster, but an operator can stay with them without getting beat up."

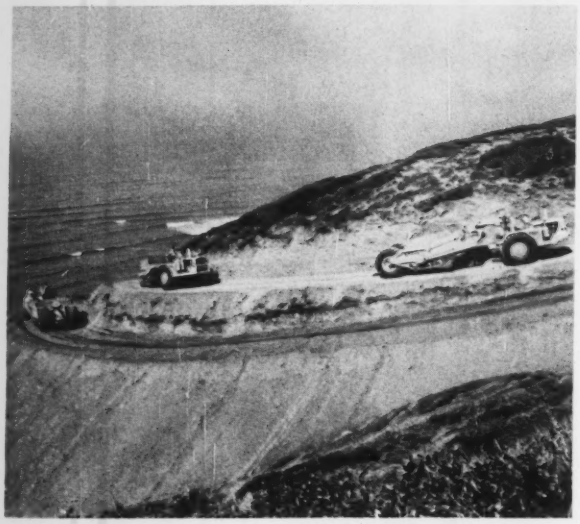
V. N. Green, Pres., V. N. Green Co., Charleston, W. Va.: "The power shift ought to speed up cycles and it looks more trouble-free. Another thing, I like the easy servicing. Both machines appear real easy for the mechanics to service. These machines will get back on the job fast. And that's important."

(continued from previous page)

that not only are they easy to operate, but there is still a built-in feel of control. An improved cable saver automatically disengages the control to prevent double blocking. Many observers felt that the big, lowbowl scrapers load easier, more evenly. Test results backed this feeling: same pusher, same load time as the DW21 but 10% more load. They observed the even boiling action that breaks the load front and back leaving practically no void behind the apron. Trying the new two-jack steering on the 631, they commented on the automotive feel-of-control that has long been famous on the DW21. The three-axle men were particularly pleased with the steering on the 630 and its shorter turning ability.

Finally, the contractors at the demonstration saw why these new haul units are the easiest to service ever designed. As factory personnel pointed out, the engines are very accessible and the complete tractor is unitized. The fan is attached to the radiator as one unit. The engine can be removed without disturbing other components. Both transmission units, torque divider and range transmission, can be removed individually without disturbing the engine. On the 631, the dash swings out and the crankcase guard is hinged to expose the engine for service work without removing it. On the 630, even the fenders are hinged for easier servicing of the big, new design 29.5 x 35 tires.

As one contractor who saw them in action said, "No matter how you judge a machine, you have to admit these two are great!"



"I BOUGHT FIVE 631s and I think Caterpillar is shortchanging itself," says A. A. Baxter, San Diego, Calif. "My experience on this sewage treatment plant site preparation job indicates that the published figures for this machine are too conservative. I believe I know why.

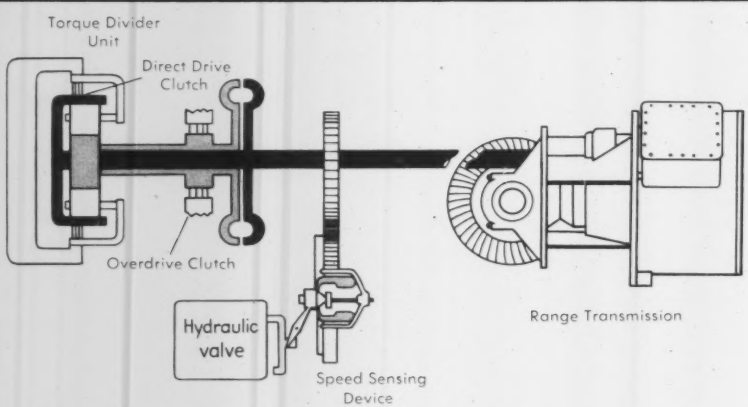
"When cycles are being checked, operators on the direct drive machines naturally work hard and make all the shifts. During an eight-hour day, they simply can't maintain that pace hour after hour.

"But they can on the 631s. Operators get a lot more out of this machine with a good deal less strain on their part. For example, on this particular job, 1000 feet of the haul is 16% adverse. The operators simply put the 631s in first range and the power shift transmission does the rest. They've found they can travel well over 50% of the grade in first range overdrive.

"The end result is that I am getting much more yardage per day in comparison with the DW21s than the Caterpillar figures indicated I would."

THE INSIDE STORY

How the new power shift transmission gives nine speeds. . . . Why it likes a "heavy-footed" operator



The power shift transmission on Caterpillar wheel Tractors is unique.

It gives you a torque converter's ability to balance speed and torque to suit underfoot conditions, but for high-speed operation on the haul road it cuts out the torque converter and gives you more efficient direct drive and overdrive. It gives you three manually-selected speed ranges and, in each range, it automatically shifts up or down through three types of drive for a total of nine forward speeds.

Although it is a simple mechanical system, it can be made to shift when not really required. But this can't happen if you keep the accelerator floorboarded. A look at the inside of this transmission (see diagram above) shows you why.

A range transmission is mounted at the rear of the machine and is operated manually with a single lever control. This one lever gives you three forward speed ranges, reverse, neutral and a special load range.

The automatic transmission is mounted right behind the engine. It consists primarily of a planetary gear set, a torque converter and two hydraulic clutches. It gives three types of drive — torque divider drive (with 25% of engine torque multiplied by a converter and 75% bypassing the converter) . . . direct drive with output shaft speed matched to engine speed . . . and overdrive, which is still direct drive, but the output shaft turns 1/3 faster than the input.

The automatic shifting is accomplished by means of a simple mechanical speed sensing device and a hydraulic valve that activates the clutches. A flyball control is driven by the drive shaft. As the machine speed picks up, the flyballs swing out and at a given RPM move the hydraulic valve engaging a clutch to shift up from torque divider to direct drive. This locks the converter out of the system. At a higher RPM this control system disengages the first clutch and engages a second clutch which changes the gear ratio to overdrive. If the machine slows down, the process is reversed thus giving automatic downshifting. A shift indicator (tachometer) shows when a change in speed range up or down is needed.

Since the automatic system is controlled by speed, it can be made to shift when not actually required. Let up on the accelerator and the transmission will shift down as if the going were getting tougher. The way to keep it most productive is to keep the accelerator floorboarded all the time. Then you'll always have the right speed and power for the job and you'll be taking full advantage of a transmission designed specifically for the kind of machine you're using and the kind of work you're doing.

A used machine can be a Good Buy...if you're careful

By Walter Schubert, General Manager, Royal Equipment Co., Houston, Texas

This rental equipment company buys only used machines. Recently, it earned $10,000 on a used D6 Tractor before spending a cent on it. Here, this company's general manager tells how you can be sure of top value in used equipment.

We're in the rental equipment business and our machines have to make money two ways.

Obviously, they have to make money for *us*. And just as important, they have to make money for our customers. That means, at a reasonable rental rate, they have to deliver good performance. If they don't, you know the answer. At the best, we get a squawk. At the worst, we lose a customer.

Now, we rent out only used equipment. That may sound as if we're taking a big risk. But we've found a sure way to buy used machines that do a money-making job both for us and our customers. We buy used equipment only from our Caterpillar Dealer.

Does it pay off? There's one used D6 we bought that earned $10,000 before we spent a cent on it. And there are others with just as good a cost record.

Our equipment is all either a "Bonded Buy" or a "Certified Buy."* These are machines that the dealer reconditions, classifies and warrants in writing, so we know what we're getting and are protected for the length of the warranty.

We have complete confidence in his Bonded and Certified Buys. In an emergency, we'll even buy one of his used Cat machines without seeing it and have him deliver it direct to our customer's job site.

There are several other reasons we specialize in used Caterpillar equipment. Most of our customers demand it—it has a terrific reputation for doing a job. Upkeep's very low, too, because Cat-built rigs are rugged and, of course, we have the advantage of that warranty period from our dealer. And the equipment retains its higher value: when we want to sell, we can get a good price.

* BONDED BUY — Cat-built machines, carefully reconditioned, backed by the dealer's written bond up to $10,000, assuring parts and service protection for the warranty period (agreed to at the time of sale). CERTIFIED BUY — a written warranty covering units of any make in good condition. Caterpillar Dealers also offer BUY AND TRY DEALS which include a written, money-back guarantee agreement on machines not in the above classifications.

How much machine is enough?

Two Florida contractors. One has D6s, the other D7s. Both have the right machine. Here are some ideas on how to make sure you don't choose too little of a machine or too much.

D7 Tractor clearing land for Lamonte-Shimberg Associates. Size and weight were no problem to this contractor, so he chose a larger machine for extra power and operating speed.

Northwest of Tampa, Lamonte-Shimberg Associates, Inc., uses a D7 to develop homesites on 700 acres of sandy land.

Nearby, J. & J. Land Clearing Co., Inc., Pinellas Park, prepares sites scattered through the Pinellas Park area with a D6. Typical terrain is sandy clay.

Which contractor has the best machine for the work? The answer's easy: *both* have. For different reasons and for the same reason.

The D7 Tractor is just the right size for the work it does—it can easily handle every task, from rough clearing to fine grading. But any tractor in the D7 size could make this claim. However, the D7 does its work in wet sandy conditions and it holds up. Size and type of machine are only two factors to consider when buying a machine. Unless a tractor also has a predictable service life that is favorable it may be "too little" regardless of its size.

Horsepower and size are only an indication of how much work the machine can do in a given time; it is no indication of how much that work will cost the tractor owner. So, the real question facing equipment buyers is, "what size machine and how much quality do I need?" True quality pays off in long life. For example, this D7, working in wet sandy conditions, has 2200 hours on the lifetime lubricated rollers that have caused no trouble and no rebuilding. The tractor has proven to be big enough, size wise, and plenty "big" when it comes to predictable *low-cost* operation. The machine stays in the same area for long periods so highway size and weight restrictions don't matter. And it's stayed on the same kind of hard work long enough to determine it is "more than enough" machine in terms of long life and reliability.

On the other hand, J. & J. Land Clearing needs to move its D6s quite often. So the smaller size and weight, which permits easy movement on highways, is important. Also, its owners feel it has all the power needed. Caterpillar dependability keeps the machine going in the roughest work. With 2300 hours on this D6 Tractor, the oil clutch has caused no trouble and doesn't even need adjusting! The lifetime lubricated rollers are still in good condition.

The kind and amount of work you do will determine the size of machine that best suits your needs. The bigger

D6 working in sandy clay for J. & J. Land Clearing Co. This machine handles every job it's called on to do, is always available, and its smaller size makes it easy to move from site to site.

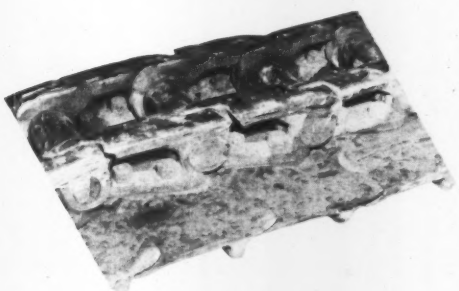
machine will produce at lower cost if used to its capacity. But machine size is only an indication of the amount of work it will do. The cost of doing that work must also be considered. This is more difficult to predict. Perhaps the best method is to look at the reputation of a particular make of machine, look at its design—features that will contribute to long life—and look to the dealer that stands behind the product. Your Cat Dealer is a man that can help you in checking the facts. He brings you his knowledge of machines and what they've done for other contractors with similar problems. He can help analyze what it will cost to handle a given amount of work with the machines you are considering. His interest is getting you the best machine for your business since his business is entirely dependent upon customers like you. He knows "how much" machine you need and he'll work with you to determine the best size.

Special Report to Users of Caterpillar Equipment: Custom TRACK SERVICE

Custom Track Service saves coal stripper $3298 by adding 3800 hours to track life

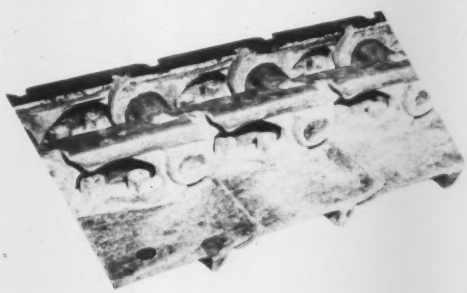
A coal stripper, ripping and 'dozing rocky overburden 7 days a week around the clock, was averaging 2300 hours of life before he *replaced* most of his totally destroyed track group parts. At the suggestion of his Cat Dealer, the stripper tried new, larger-size undercarriage parts. By following recommendations of the dealer's undercarriage specialist at 2440 and 4030 hours, the undercarriage went a total of 6100 hours with only pin and bushing replacements . . . and all but the shoes were rebuildable instead of scrap! Up to this point, Custom Track Service saved the stripper a $3298 cash outlay; and since he was able to rebuild the links and reuse the pins and bushings instead of replacing with new assemblies, he realized additional savings.

PAST EXPERIENCE



ALL BUT SHOES READY FOR SCRAP PILE AFTER 2300 HOURS

PRESENT EXPERIENCE



COMPLETELY REBUILDABLE EXCEPT SHOES AFTER 6100 HOURS

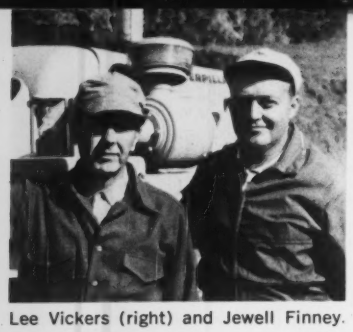
HOW CUSTOM TRACK SERVICE HELPS LOWER COSTS

Custom Track Service, available only from your Caterpillar Dealer, is designed to help you get the most possible service from undercarriage parts and thus cut costs. Factory-trained specialists are ready to help solve your particular track problems. They can give sound recommendations to help you get the most from your undercarriage.

They can advise you on maintenance . . . help you tailor the many special undercarriage parts and track options available to meet various job conditions. As a result, costs per hour go down and profit and machine availability go up.

These undercarriage specialists are backed by modern track undercarriage rebuilding facilities manned by experienced personnel . . . by the largest and most complete stock of standard and special application parts available . . . by Parts Exchange Assemblies that keep tractors working and earning.

Check with your Cat Dealer and learn how Custom Track Service can help you to reduce costs.



Lee Vickers (right) and Jewell Finney.

The only machine they had was a Cat 944, so . . .

They did what couldn't be done with (most) wheel loaders

Until recently, you could find pit run iron ore—two inches and less in size—right on the surface of the ground around Gladewater, Texas. So road contractors had plenty of low-cost base material. But in the last few years it has gotten scarce and expensive. Lee S. Vickers and Jewell Finney saw this as an opportunity to go into the rock crushing business. Their Atlas Construction Co. opened a crushing plant in Gladewater in June of 1960.

In their 160-acre pit, they have an almost unlimited supply of limonite iron ore with plenty of hemotite and mortar sand. But before tapping this raw material, Vickers and Finney had a couple of tough problems to solve. First they had to clear 25 acres of pecan and oak up to 20 inches in diameter. The only machine they had was a 944 wheel Traxcavator, bought for use in the crushing operation. This isn't the type of machine they'd ordinarily choose for a tough clearing operation but it was available. They decided to try it. And it did the job, with no trouble.

The next task was preparing the site for the crusher and building a settling basin for water used in washing crushed ore. Again, the rugged 944 handled all the work, doing plenty of really heavy excavating in moving 20,000 yards of rock and gravel and without a hitch.

Now, after putting them in business by handling work that many wheel loaders couldn't do, the 944 is still on the job every day. It excavates, loads the hopper of a 10" x 24" jaw crusher and loads out trucks at the rate of 1200 yards of pit run material a day. As Lee Vickers puts it, "The 944 does everything but crush rock for us!"

After clearing and excavating to prepare the crusher site, 2-yd. 944 Traxcavator now handles all loader jobs at the crushing plant of the Atlas Construction Co.

How did Vickers and Finney come to choose a Traxcavator? Lee Vickers is a good man to ask. He had 10 years of experience with wheel loaders as city manager of Gladewater, Orange and other Texas cities before joining Atlas Construction Co. He says, "One look at the 2-yd. 944 in action convinced me that the seven years of Cat research that went into it had really paid off. It's the easiest machine to operate I've ever seen. It's unusually safe, fast and has as much power (105 HP at the flywheel) as we'll ever need.

"We were offered some big discounts to buy other loaders, but we were more interested in long-term economy and steady production than initial price. When I was in city management work I saw the fallacy of buying low bid. Often you have a lot of repair problems and spend much more to keep the machine going than a good machine would have cost in the first place.

"Frankly, we couldn't be more satisfied with the 944, and if we ever expand to the point where it can't handle the volume, we'll get another."

For the best in new and used machines, and the best in parts and service—see your Caterpillar Dealer

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

(Continued from page 192)

▲ **Tex., Austin**—Walter R. Carrington & Wm. M. Day, Perry Brooks Bldg., 195 unit MOTEL, South Interregional Hy. **$1,250,000.**

▲ **Tex., Dallas**—Republic National Bank of Dallas, Pacific and Ervay Sts., BANK-OFFICE, St. Paul and Bryan Sts. **$5,000,000.**

▲ **Tex., San Antonio**—Morris Kallison, Kallison Properties, 136 Main Plaza, plans by Henry L. Fox, 136 Main Plaza, 4 story ADDN., Brady OFFICE and GARAGE, **$2,000,000.** CD 4/21/61.

▲ **Tex., San Antonio**—Medical & Surgical Bldg., Corp., Natl. Bank Commerce Bldg., plans by Bartlett Cocke, 3501 Broadway Ave., 7 story, bsmnt., A/C, underground tunnel DOCTORS OFFICE, Main and Quincy, **$2,000,000;** 400 car PARKING FACILITY, Main and Quincy, rear of Doctors Office Bldg., **$300,000;** 4 story, DOCTORS OFFICE ADDN., Main and Quincy, **$600,000.**

▲ **Wis., Hudson**—Hudson Houses Corp., c/o International Properties, First National Bank Bldg., Minneapolis, Minn.; Hudson House MOTEL, 14 mi. east of Twin Cities. **$1,000,000.** Constr. in Summer.

▲ **Wis., Milwaukee**—First Wisconsin National Bank, 743 North Water St., plans by E. J. Kraus, c/o owner, 8 story, 60 x 180 ft. BANK ADDN. **$2,000,000.**

▲ **Wis., Milwaukee**—Northwestern National Insurance Co., 526 East Wisconsin Ave., plans by Grassold, Johnson & Assocs., 734 North Jefferson St., 5 story OFFICE ADDN. **$2,750,000.**

▲ **Wis., Whitefish Bay (P.O. Milwaukee)**—Country Day School, 6255 North Santa Monica Blvd., plans by Kloppenburg & Kloppenburg, 5906 North Port Washington Rd., SCHOOL ADDN. **$1,000,000.**

▲ **Wyo., Casper**—Sunrise Corp., Casper, plans by Forrest Hamilton, Casper, SHOPPING CENTER. **$1,350,000.** Bids in June.

▲ **Ont., Ottawa**—Bell Telephone Co. of Canada, 1050 Beaver Hall Hill, Montreal, Que., plans by Barott, Marshall, Merrett & Barott, 1425 Mountain St., Montreal, Que., 5 story TELEPHONE EXTENSION, Albert and O'Connor Sts. **$2,500,000.** Lindley Shector, 1425 Mountain St., Montreal, Que., consult. engr. CD 11/9/60.

INDUSTRIAL BUILDINGS

▲ **Fla., Panama City**—Gulf Power Co., 75 N. Pare St., Pensacola, STEAM-ELECTRIC GENERATING PLANT, North Bay Area. **$20,000,000.** Southern Engineering Services, 600 N. 18th St., Birmingham, Ala., consult. engrs. CD 4/12 61.

▲ **Ga., Albany**—Georgia Power Co., 15 Forsyth St. S.W., Atlanta, plans by Southern Services, Southern Co., 1330 W. Peachtree St. N.W., Atlanta, 125,000-kw (3rd unit) Steam-Electric PLANT, Mitchell. **$22,000,000.**

▲ **Ga., Milledgeville**—Georgia Power Co., 15 Forsyth St. S.W., Atlanta, plans by Southern Services, Southern Co., 1330 W. Peachtree St. N.W., Atlanta, 250,000-kw steam-electric Sinclair Dam PLANT, Lake Sinclair. **$42,000,000.**

▲ **Ill., Naperville**—Pioneer Publishing Co., 1421 E. Main St., St. Charles, NEWSPAPER PUBLISHING PLANT. **$1,000,000.**

▲ **Mich., Grand Rapids**—Lear, Inc., 3171 S. Bundy St., Santa Monica, Calif., PLANT, ENGINEERING and ENVIRONMENTAL TEST LABORATORIES, at Instrument Div. **$3,500,000.** CD 6/23/54.

▲ **N. J., Edison-Calabro Builders, Inc.**, 1103 Mary St., Elizabeth, INDUSTRIAL PARK, Talmadge Rd. **$1,500,000.**

▲ **O., Austintown (br. Youngstown)**—McKay Machine Co., 825 W. Federal St., Youngstown, 145,000 sq. ft. MACHINE SHOP and ASSEMBLY PLANT, 3 story OFFICE, Hendricks Rd. **$2,000,000.**

Tex., Houston—Petro-Tex Chemical Corp. (Food Machinery & Chemical Corp. and Tennessee Gas Transmission Co.), La Porte Rd., tetrahydrophthalic anhydride PLANT completed. Cost **$22,000.** Scientific Design Co., 2 Park Ave., New York, N. Y., were not engineers on project. (**Correction**—cost of project and engineers.) CD 1/11/61.

▲ **Tex., Paris**—Campbell Soup Co., 100 Market St., Camden, N. J., plans by Lockwood Greene Engineers, Inc., 41 E. 42nd St., New York, N. Y., engr.-archt., FOOD PROCESSING PLANT, **$6,000,000.** Bids July or August 1961. CD 4/15/59.

▲ **Va., Richmond**—Royal Mfg. Co., Meadow and Clay Sts., plans by Stainback & Scribner, National Bank Bldg., Charlottesville, 1 story, 150,000-160,000 sq. ft. brick LABORATORY FURNITURE FACTORY; 10,000 sq. ft. OFFICE SPACE, Rte. 201 and Bellwood Rd., near here. **$1,500,000.** CD 4/13/61.

LATIN AMERICA

▲ **Brazil, Cubatao**—Union Carbide de Brasil S.A. (subsidiary of Union Carbide International Co., 30 E. 42 St., New York, N. Y., U.S.A.), POLYETHYLENE PLANT ADDN. **$4,500,000.**

FOREIGN

▲ **Jordan-Arab Potash Co.**, Amman, Jordan, is asking engineering proposals within sixty days for plans, specifications, bid analysis and supervision of construction POTASH PLANT at Dead Sea. **$18,000,000.** Additional information available on loan from Bureau Foreign Commerce, Trade Development Division, U. S. Dpt. Commerce, Wash. 25, D. C., U.S.A.

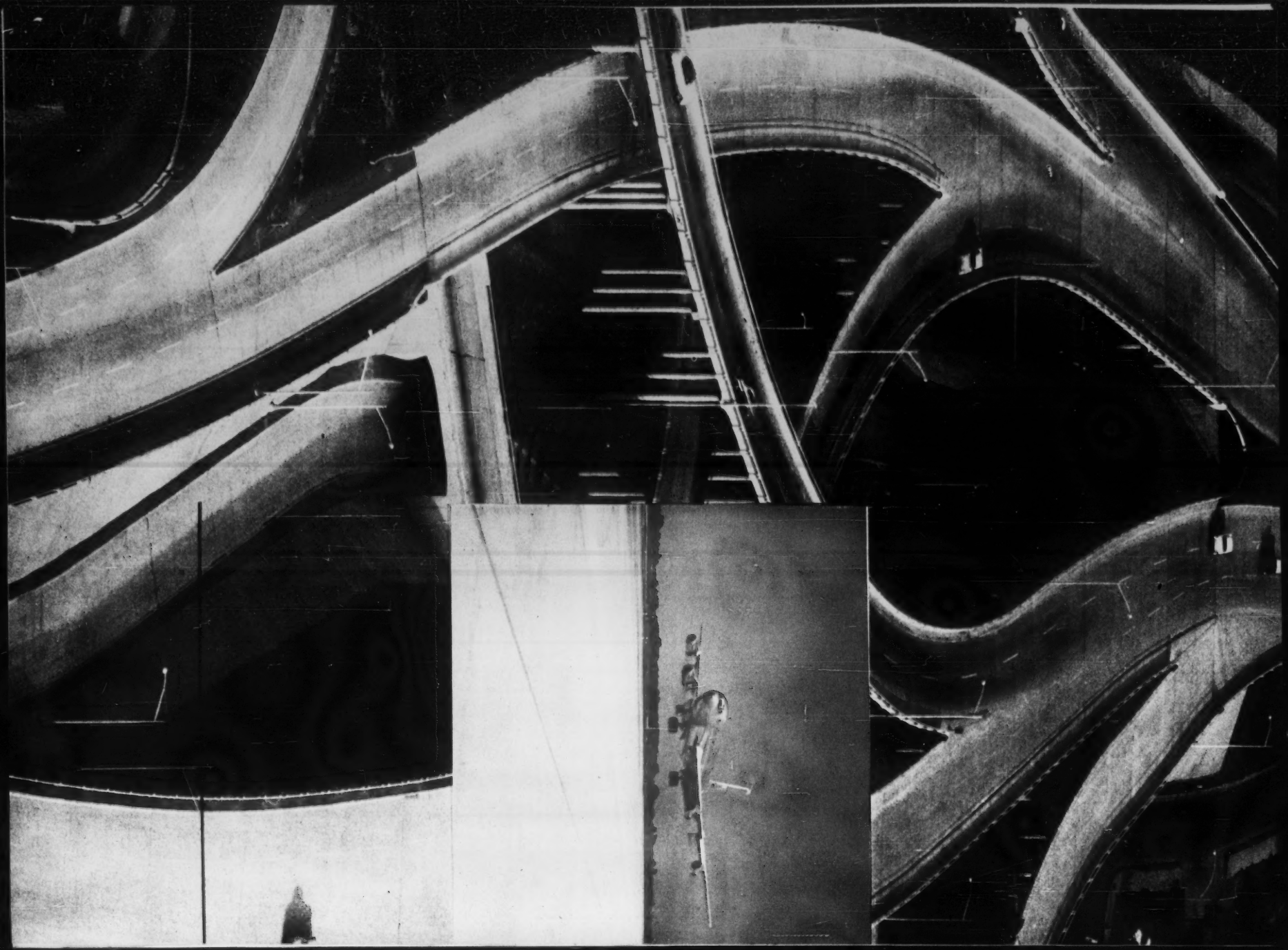
▲ **Thailand**—State Railway of Thailand, Bangkok, 2,175 mi. modernization RAILWAYS. **$54,600,000.** World Bank Loan $22,000,000. (Six Year Program). CD 10/8/59.

WHEN HE GOES UP...YOUR COSTS GO DOWN!

This man builds fast, and he builds to last. He works with steel...the proven material for strength, endurance, and adaptability. He works for Ingalls...the proven source for skill, versatility, and economy in steel fabrication and erection. Steel and Ingalls...together they make a great team. Why not get them on your side on your next construction job?

The Ingalls Iron Works Company / Birmingham, Alabama

INGALLS



For jet runways and high speed turnpikes . . .

SYMONS® CONE CRUSHERS

produce big tonnages of quality construction materials at low cost per ton

Symons Cone Crushers are built in Standard, Short Head and Intermediate types with crushing heads from 22" to 10' in diameter, in capacities from 6 to over 1500 tons per hour. Shown above is a typical Symons Cone Crusher installation, producing large tonnages of quality aggregates.

At left is a view of the Fort Worth Interchange, on the Dallas-Fort Worth Turnpike. The inset view shows a jet taking off from one of the modern concrete runways at Chicago's O'Hare International Airport. These are but two of the many examples of the contributions being made by the construction industry in the interest of improved transportation.

Construction for today's transportation needs is highly competitive big business. Competition these days is rough . . . bids must be kept low. More often than not, profit depends on equipment you can rely on for day-after-day output of high tonnages of specification material at low per-ton cost.

Symons Cone Crushers meet these demands for production at a profit. Their unequaled record for consistent dependability under the toughest crushing conditions, low maintenance costs, and high capacity production of finely crushed construction materials is known to contractors, operators and engineers all over the world.

Available for stationary, portable and semi-portable service, Symons Cone Crushers—like all Nordberg machinery and equipment for the construction industry—have become *first choice where maximum output at lowest possible cost is needed.*

SYMONS . . . *a registered Nordberg trademark known throughout the world.*

NORDBERG MANUFACTURING COMPANY, Milwaukee 1, Wisconsin

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHOENIX
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C361

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—BA

† **Mass., Watertown**—BA On Or About 6/6—U. S. Eng., 424 Trapelo Rd., Waltham, Zone 54, BERYLLIUM-URANIUM LABORATORY, Bldg. 312, Watertown Arsenal, ENG-19-016-61-76. $600,000. Plans deposit $10. CD 7/22/60.

▲ **Conn., Wallingford** — BA 6/8 — Town, 1958 Bldg. Comm., North Main St., East Side JUNIOR HIGH SCHOOL, Pond Hill Rd. $1,800,000. Plans deposit $35. Ketchum & Sharp, 227 E. 44 St., New York, N. Y., archts. Cosentini Assocs., 10 Columbus Circle, New York, N. Y., engrs. CD 4/21/60.

BUILDINGS—SLC

▲ **Conn., Clinton**—Universal Wire Co., S. Country Lane, East Greenwich, R. I., soon lets contract 1 story, 100,000 sq. ft. masonry, steel MFG. PLANT, Morgan's Landing. $1,200,000. A. M. Kinney Assocs., 60 E. 56 St., New York, N. Y., archts. CD 4/11/61.

HEAVY CONSTRUCTION—LB & CA

MAINE—State Hy. Comn., Augusta, ROAD,
David Nassif Co., 500 Statler Office Bldg., Boston, Mass., CA $531,266 (6 bidders), grading, drainage and base proj. 2.295 mi., Towns of Newport and Plymouth, FAP No. I-95-7(8) 152, Penobscot Co. BA 5/3. CD 4/17/61.

NEW HAMPSHIRE—Dpt. P. Wks. & Hys., Concord, ROAD,
Weaver Bros. Constr. Co., Inc., 321 S. Main St., Concord, N. H., LB $593,979, (5 bidders), 0.336 mi. hot b. conc. roadway and 259 ft. 5 span steel beam bridge, Belknap Co.

VERMONT—State Dpt. Hys., State House, Montpelier, Bids opened 5/5. ROADS,
Blow & Cote, Inc., Box 637, Morrisville, Vt., and **Eugene O. Morin**, RFD No. 3, Barre, Vt., LB $529,911, est. $500,000, (9 bidders), highway and bridge, South Burlington-Winooski Int., Rte. 89, South Burlington and Winooski, Contract 2, Proj. 1-89-3(10). CD 4/3/61.

BUILDINGS—LB & CA

H. P. Cummings Constr. Co., High St., Woodsville, N. H. CA $646,200, DORMITORY, Proj. No. CH-Vt-17-(D), MONTPELIER, VT. Vermont College, College St., Montpelier, Vt. BA 4/27/61. CD 5/4/61, under LB.

S. Volpe & Co., Inc., 185 Devonshire St., Boston, Mass. CA $589,355, est. $600,000, Mass-2-26, HOUSING FOR THE ELDERLY, Pond St., Jamaica Plain, BOSTON, MASS., City Housing Auth., 230 Congress St., Boston, Mass., BA 4/14, CD 4/19/61, under LB.

White Constr. Co., 135 Cambridge St., Burlington, Mass., LB $656,000, (21 bidders), Proj. E-59-10, Contr. 1, POWER PLANT IMPRVS., State Teachers College, FRAMINGHAM, MASS. Commonwealth Mass., Dpt. Educ., Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. BA 5/5. CD 4/5/61.

C. Rolland Oswald, 2123 John St., Schenectady, N. Y., CA Est. $500,000, RESEARCH LABORATORY with ADMINISTRATION WING, Holden St., NORTH ADAMS, MASS. Sprague Electric Co., Marshall St., North Adams, Mass. BA 4/18. CD 3/30/61

Pace Bldrs, Inc., 80 E. State St., Westport, Conn., CA Est. $750,000, Orange COUNTRY CLUB, enlarge club house and golf course, recreational area, 2 swimming pools, ORANGE, CONN. Golf Assocs., c/o Leon A. Katz, 125 E. 170 St., New York, N. Y., CD 5/9/61.

Emil Schmitz Co., 18 Trumbull Ave., Plainville, Conn., Owner Builds, $900,000, 90 HOUSES, New Britain Ave., PLAINVILLE, CONN.

Horn Constr., Inc., 254 Prospect Ave., Hartford, Conn., CA $600,000, 60,000 sq. ft. SHOPPING CENTER, Main St., WILLIMANTIC, CONN. John E. Hayes, 170 Sigourney St., Hartford, Conn. Russell, Gibson & Von Dohlen, 10 Ellsworth Rd., West Hartford, Conn., archts. Burton & Van Houten, 993 Farmington Ave., West Hartford, Conn., engrs. CA 5/8/61.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS

May 23, June 1 Maryland — June 9 Pennsylvania

BUILDINGS—BA

▲ **N. Y., Buffalo**—BA 6/7—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, general contract 8 story pile fdn. OFFICE., Proj. 16544. $3,000,000. Plans deposit $50.

† **Md., Forest Glen**—BA On Or About 6/13—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D.C., SERVICE BLDG., Army Medical Center, Forest Glen Section, ENG-49-080-61-44(42). $800,000. CD 6/11/47.

Pa., Sharpsville—BA 6/13—Pa. Pub. School Bldg. Authority, 101 S. 25th St., Harrisburg, SECONDARY SCHOOL ADDN., for Sharpsville Joint School Board, Proj. D6-709. $615,000. Plans deposit $35. Hunter, Heiges & Gross, Shenango and Reno Sts., Sharon, archts. CD 1/10/61.

▲ **N. Y., Albany**—BA 6/14—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, general contract steel frame, brick, mat. fdn. OFFICE, Bldg. 12, Department of Labor, Div. of Employment, Campus Site. Proj. 16349. Approx. $13,000,000. Plans deposit $50. Eggers & Higgins, 100 E. 42 St., New York, archts.

▲† **Pa., Phila.**—BA 6/15—Dist. Pub. Wks. Office, 4th Naval Dist., Bldg. No. 1, 2nd Floor, U. S. Naval Base, 400 units CAPEHART HOUSING, U. S. Naval Base Activities, IFB 30891/61. CD 1/12/61.

HEAVY CONSTRUCTION—LB & CA

NEW YORK—State Dpt. P. Wks., State Office Bldg., Albany, ROAD,
rejected bids Mar. 29, b. conc. 5.81 mi., misc. work 0.14 mi. Java Center-Waldo Corners, Smith Corners, SH 1716 Java Center-Java Village, SH 894, Rte. 78 FARC 61-2. Proj. F-158(2), Wyoming Co. LB $685,119. CD 3/30/61, under LB.

▲ **A & J Fago, Inc.**, 521 Young St., Tonawanda, N. Y., LB $1,168,324 crosstown prestressed concrete pipe TRANSMISSION MAIN, ROCHESTER, N. Y. Monroe County Water Auth., 339 East Ave., Rochester, N. Y. BA 5/1. CD 4/11/61.

† **Irvin T. Miller & Co., Inc.**, Box 428, Burgettstown, Pa., CA $543,837, FLOOD CONTROL PROJ., Chartiers Creek, city Washington and Twp. of Canton, ENG-35-058-61-31, PENNSYLVANIA. U. S. Eng., 925 New Federal Bldg., Pittsburgh 19, Pa. BA 4/18/61. CD 3/20/61

MARYLAND—State Rds. Comn., 300 W. Preston St., Baltimore Zone, Bids opened 5/2, ROAD,
Bituminous Constr. Co., 3301 Ridgewood Ave., Baltimore, Md., LB $621,313, grading, drainage and surf. 3.8 mi. southbound lane US 50 from Easton to South Rte. 565, Talbot Co. CD 4/12/61.

BUILDINGS—LB & CA

Heyward-Robinson Co., 114 Liberty St., New York 6, N. Y., CA Est. $800,000, 10 story Financial Park East GARAGE, southwest corner Fulton and Clifton Sts., NEW YORK, N. Y. Penny Park Systems, Inc., 80 Wall St., New York 5, N. Y.

▲ **New York City Housing Auth.**, Rm. 312, 299 Broadway, New York 7, N.Y., rejected bids Mar. 28 general contract, heating and ventilating, electrical work and plumbing work, Baychester HOUSES, Proj. NYS-92, Schieffelin Ave., E. 229 St., Schieffelin Pl. and E. 225 St., Bronx Boro, NEW YORK, N. Y. CD 3/30/61, under LB.

▲ **Otis Elevator Co.**, 260 11th Ave., New York 1, N. Y., LB $2,129,331, (3 bidders), general contract AUTOMATIC ELEVATORS, Municipal Bldg., Chambers and Centre Sts., Manhattan Boro, NEW YORK, N. Y. Dpt. P. Wks., Rm. 1800 L, Municipal Bldg., New York 7, N. Y. BA 5/10. CD 4/10/61.

▲ **Terminal Constr. Corp.**, State Hy. 17, Wood-Ridge, N. J., LB $3,711,375 (5 bidders), Proj. NY-5-32, fdns. and general contract Samuel Gompers HOUSES which includes Bldgs. 5 and 6, Hamilton Fish Park, Willett St., Delancey St. and Pitt St., Manhattan Boro, NEW YORK, N. Y. New York City Housing Auth., Purchase Div., Rm. 1002, 299 Broadway, New York 7, N. Y. BA 5/9. CD 4/20/61.
Glass Bros., Inc., 2623 Jerome Ave., New York 68, N. Y., LB $638,711 (4 bidders), plumbing Samuel Gompers HOUSES, Manhattan Boro (New York, N. Y.).

Roosevelt Properties, Inc., Roosevelt Raceway, Westbury, N. Y., CA Est. over $500,000, 21,000 sq. ft. OFFICE, Merrick Ave., ROOSEVELT, N. Y. Roosevelt Raceway, Inc., Roosevelt Raceway, Westbury, N. Y. Brown & Mathews, 425 Park Ave., New York 22, N. Y., archts. American Plan Corp., 99 Park Ave., New York, N. Y., lessee. CD 5/2/61.

David & Co., 433 Main St., Metuchen, N. J., CA Est. $500,000, 21 HOUSES, Clara Barton Section, EDISON, N. J. David Kushinsky, 265 South Park Dr., Woodbridge, N. J. CD 2/9/61.

† **A. A. Salerno**, 41 Relyea Pl., New Rochelle, N. Y., LB $509,985 (10 bidders), approx. 6,250 sq. ft. CLIMATIC TEST CHAMBER, incl. sidewalks, aprons and all appurtenant facilities, etc., ENG-30-075-61-95, FORT MONMOUTH, N. J. U. S. Eng., 111 E. 16th St., New York 3, N. Y. BA 5/4/61. CD 4/24/61.

▲ **The Johansen Co.**, 237 South Ave., Garwood, N. J., CA Est. $7,000,000, general contract and fdns., ISOCYANATE PLANT, Tremley Point Section, LINDEN, N. J. Nopco Chemical Co., 60 Park Pl., Newark, N. J. Work underway. CD 2/23/61.

▲ **John Lawrence**, 406 Essex Ave., Spring Lake, N. J., Owner Builds, $1,250,000, 65 HOUSES, Sylvania Ave., NEPTUNE CITY, N. J. Dominick Troiano, Pine St., Budd Lake, N. J., archt.

John Lawrence, 406 Essex Ave., Spring Lake, N. J., Owner Builds, $850,000, 48 HOUSES, Sea View off Yale Ave., POINT PLEASANT, N. J. Dominick Troiano, Pine St., Budd Lake, N. J., archt.

Hand-Sum Homes, 10 S. Harrison St., East Orange, N. J., Owner Builds, $750,000, 74-unit GARDEN APARTMENT, S. Bridge St., SOMERVILLE, N. J. Rotwein & Blake, 1018 Stuyvesant Ave., Union, N. J., archts.

▲ **Boyd H. Kline**, Old Berwick Road, Bloomsburg, Pa., LB $4,102,326, general contract, 4 WARD BLDGS., sewage treatment plant, water, heat and sewerage systems, roads, White Haven State School, WHITE HAVEN, PA. General State Authority, 18th and Herr Sts., Harrisburg, Pa., BA 5/10/61, CD 4/3/61;
Welsbach Corp., 1500 Walnut St., Phila., Pa., LB $1,256,947, HEATING and VENTILATING for White Haven State School, (White Haven, Pa.);
Hughes Corp., 245 Charles St., Luzerne, Pa., LB $777,900, PLUMBING, for White Haven State School, (White Haven, Pa.);
William A. Donmoyer Co., 4240 Tilghman St., Altoona, Pa., LB $581,780, ELECTRICAL, for White Haven State School, (White Haven, Pa.).

▲ **McCloskey & Co.**, 1622 W. Thompson St., Phila., Pa., CA $10,000,000, OFFICE, North Charles St., BALTIMORE, MD. Charles Street Development Corp., Broad and South Sts., Baltimore, Md. Vincent G. Kling, 917 Corinthian Ave., Phila., Pa., archt. McCormick-Taylor Assocs., Suburban Station Bldg., Phila., Pa., engrs. CD 3/2/61.

▲ **L. G. Meltzer**, 4407 Arnold Rd., Suitland, Md., Owner Builds, $1,320,000, 132-unit APARTMENT, Oglethorpe St. and Baltimore Blvd., HYATTSVILLE, MD. Cohen & Haft, 110 Spring St., Silver Spring, Md., archts. CD 10/4/60.

Commercial Contractors, Inc., 422 E. North Ave., Baltimore, Md., LB $680,000, brick, concrete block Chapel Hills ELEMENTARY SCHOOL, Joppa Rd. east of Convention Ave., near Parkville, TOWSON, MD. Bd. Educ. Baltimore Co., Aigburth Rd., Towson 4, Md. BA 4/20. CD 4/12/61.

Howard Siegel, c/o beau-Marc Chapel Hill Rd., Middletown, N. J., Owner Builds $500,000. 20 HOUSES, Chapel Hill Rd., MIDDLETOWN, N. J. Gerber & Pancani, 11 Commerce St., Newark, N. J., archts.

Cee Bee Contractors, Inc., P.O. Box 9127, Wash., D. C., LB $667,540 (7 bidders), Frederick Sasser HIGH SCHOOL ADDN., MARLBORO, MD. Prince Georges Co. Bd. Educ., Marlboro, Md. BA 5/2. CD 4/18/61.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES

May 24 Louisiana — May 26 Tennessee
May 30 Florida
STREETS AND ROADS
May 23 West Virginia — May 26 Kentucky, Tennessee
May 30 Florida

BUILDINGS—BA

▲ **Ky., Bowling Green**—BA 6/7—Bowling Green-Warren County Hospital, HOSPITAL ADDNS., ALTERATIONS. $1,400,000. Plans deposit $150. Otis & Grimes, Tyler Bldg., Louisville, Zone 2, archts. Southern Engineering Co., 322 W. Jefferson, Louisville, Zone 2, engr. CD 3/1/61.

S. C., Clemson—BA 6/7—Clemson College, Clemson, MATHEMATICS and ENGLISH BLDG. Over $500,000. Plans deposit $100. Baker & Gill, 609 Chestnut St., Florence, archts. CD 2/15/61.

† **Va., Alexandria**—BA On Or About 6/8—U. S. Eng., First and Douglas Sts. N.W., Wash., D. C., 1 and 2 story, 3-unit, 74 x 232 ft. U. S. ARMY RESERVE CENTER; and 1 story, 46 x 81 ft., three-bay MAINTENANCE SHOP, ENG-49-080-61-51-(46). $600,000. (Small business set-aside.)

Ala., Birmingham—BA 6/13—City Bd. Educ., 3015 7th Ave. N., Banks HIGH SCHOOL ADDN. $650,000. Warren Knight & Davis, Protective Life Bldg., archts. CD 12/12/60.

BUILDINGS—SLC

▲ **Fla., Daytona Beach**—Bd. Comrs. Halifax Hospital Dist., c/o Commercial Bank Bldg., 120 S. Ridgewood, soon lets contract east wing to Halifax HOSPITAL, Lake Shore Dr. and Hilton Dr. $2,000,000. Plans deposit $60. Extended date. W. R. Gomon & Assocs., Box 1671, archts. CD 4/14/61

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Dpt. Hys., 1221 East Broad, Richmond, BRIDGES,
Va.—**L. S. Abernethy Co., Inc.**, Rte. 4, Glen Allen, Va., CA $571,254, Contr. V, 5 bridges between Carolina County line and 0.5 mi. north Rte. 1 on Rte. 95, Proj. 0095-088-101, B605, B606, B608, B609, B610, Spotsylvania Co.;
Va.—**Bowers Constr. Co.**, Box 1706, Raleigh, N. C., CA $627,232, Contr. IV, 5 bridges between Carolina County line and 0.5 mi. north Rte. 1 on Rte. 95, Proj. 0095-088-101, B601, B602, B603, B604, B619, Spotsylvania Co. BA 4/26/61. CD 5/1/61 under LB.

SOUTH CAROLINA—State Hy. Dpt., Office Bldg., corner of Senate and Assembly Sts., Columbia, ROAD,
Sloan Constr. Co., Peoples Natl. Bank Bldg., Box 747, Greenville, S. C., CA $574,329, grading, earth type base course and b. conc. surf. for reconstr. and widening 19.725 mi. US Rte. 1 from Aiken to Batesburg, F. A. Proj. No. F-37(5), S. C. Dockets Nos. 2.445, 32.444 & 41.317, Aiken, Lexington and Saluda Counties. BA 4/18/61. CD 4/25/61, under LB.

† **Ruscon Constr. Co.**, 149 E. Bay St., Charleston, S. C., CA $621,428, FIRE CONTROL and NAVIGATION BLDG., Charleston Naval Shipyard, NBy 31327, CHARLESTON, S. C. P. Wks. Office, 6th Naval Dist., Bldg. 13, U. S. Naval Base, Charleston, S. C. BA 4/25/61. CD 4/27/61, under LB.

▲ **FLORIDA** — State Road Dpt., Tallahassee, Fla., ROADS,
Bay Dredging & Constr. Co., Box 1481, Tampa, Fla.,

CA $1,288,938, grading, 4-lane divided limerock base, Type I b. conc. surf. course, binder, removal existing structure, constructing 752-ft. four-lane bridge eleven spans conc. slab deck prestressed beams, two flaking spans conc. deck, steel I-beams, prestressed conc. prestressed composite conc. welded steel rail pile bents, electrically-operated double-leaf bascule span conc. piers founded steel H-piling; conc. sheet pile bulkhead, approx. 1.441 mi., between SR 595, at Bay Pines and Madeira Beach, Federal Aid Secondary Project No. S-538(1) (Job No. 15100-3150), SR 699-A (Welch Causeway), Pinellas Co. BA 4/27/61. CA 5/9/61. CD 5/2/61, under LB.

† **Bertucci Bros.**, Box 4280, New Orleans, La., CA $886,250, RETENTION DIKE, 80,000 cu. yd. clam shell, 125,000 tons riprap, Mississippi River-Gulf Outlet, Chandeleur Sound, CIVENG-16-047-61-136, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. BA 4/11. CD 4/17/61, under LB.

Abraham Constr. Co., Box 2870, Baton Rouge, La., LB $544,649, (9 bidders), SEWAGE PUMPING STATIONS S-3 and S-4, BATON ROUGE, LA. City-East Baton Rouge Parish, Municipal Bldg., Baton Rouge, La. Parsons, Brinckeroff, Quade & Douglas, 233 St. Ferdinand St., Baton Rouge, La., engrs. CD 6/22/50.

BUILDINGS—LB & CA

R. K. Stewart Co., 1519 S. Main St., High Point, N. C., LB $597,000, Northeast Consolidated HIGH SCHOOL, GREENSBORO, N. C. Guilford County Bd. Educ., Courthouse, Greensboro, N. C. BA 5/4/61. CD 5/1/61.

Charles J. Craig Constr. Co., 1610 Westminster Drive, Columbia, S. C., CA $809,332, INTENSIVE TREATMENT HOSPITAL for mentally retarded children, Whitten Village, CLINTON, S. C. State Mental Health Comn., State Office Bldg., Columbia, S. C. BA 4/26/61. CD 5/3/61, under LB.

O'Neill-Dunham, Inc., P.O. Box 7507, Station C, Atlanta, Ga., LB $608,157, CHURCH EDUCATIONAL CHAPEL BLDG., ATLANTA, GA. Lutheran Church of the Redeemer, 731 Peachtree St., NE, Atlanta, Ga. BA 5/4/61. CD 4/12/61.

Eastern Constr. Co., 18301 N.W. 2nd Court, Miami, Fla., Owner Builds, $640,000, 65 RESIDENCES, vicinity of N.W. 2nd Court and 183rd Terrace, MIAMI, FLA. Gerard Pitt, 211 N.E. 97th St., Miami Shores, Fla., archt.

▲ **Fairmont Homes**, 100 N.E. 125th St., North Miami, Fla., Owner Builds, $1,560,000, CB-S brick trim 130 RESIDENCES, S.W. 124th St. and S.W. 70th Ave., MIAMI, FLA. Paul Grupp, 714 126th St. N., Miami, Fla., archt.

▲ **Feldman Bldg. Corp.**, 605 Lincoln Rd., Miami Beach, Fla., CA $1,000,000, 100 units, 12 story CB-S APARTMENT, BAL HARBOUR (BR. MIAMI), FLA. Balmoral Hotel Corp., 9801 Collins Ave., Bal Harbour (Br. Miami), Fla. Lapidus-Harle & Liebman, 940 Lincoln Rd., Miami Beach, Fla., archts.

Jeffery Investment Co., Inc., 3201 N.W. 185th St., Miami, Fla., Owner Builds, $650,000, 67 RESIDENCES, S.W. 98th Ave. and 41st St., MIAMI, FLA.

▲ **Regal Homes**, 102nd Ave. and U.S. 19, St. Petersburg, Fla., Owner Builds, $1,250,000, 100 HOUSES, Florida Retirement Village, ST. PETERSBURG, FLA.

▲ **R. M. Thompson Co.**, 712 Grand Central St., Clearwater, Fla., CA Est. $4,000,000, 309,000 sq. ft. Winston Plaza SHOPPING CENTER 83rd Ave. and 4th St., First Phase, ST. PETERSBURG, FLA. Winston Muss Corp., c/o W. B. Wiley, 8301 4th St. N., St. Petersburg, Fla. CD 11/10/59, under Petwinston, Inc., as owner.

▲ **Wiggs & Maale Constr. Co.**, P.O. Box 2154, West Palm Beach, Fla., LB $1,569,500, (5 bidders), 142 units La Fontana Cooperative APARTMENTS, WEST PALM BEACH, FLA. J & N Constr. Co., 941 N.E. 79th St., Miami, Fla. BA 5/5/61. CD 4/18/61.

Forbes-Morris Bldg. Co., 1400 Forbes Rd., Lexington, Ky., CA $720,000, CHURCH and EDUCATIONAL BLDG., LEXINGTON, KY. Immanuel Baptist Church, 449 E. High St., Lexington, Ky. BA 4728. CA 5/5. CD 5/5/61, under LB.

▲ **Struck Constr. Co.**, 147 C. Clay St., Louisville, Ky., LB $2,564,000 (5 bidders), HOUSING FOR THE ELDERLY, Cold Springs, NEWPORT, KY. Campbell County Fiscal Court, 240 4 St., Newport, Ky. BA 5/8. CD 4/7/61.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 25 Indiana

STREETS AND ROADS

May 25 Indiana

▲† Illinois—BA 6/29—U. S. Eng., 1819 Pershing Rd., Chicago, FLOOD CONTROL, Beardstown, Proj. 61-17. $1,100,000. CD 9/23/60.

BUILDINGS—BA

† **Wis., Milwaukee**—BA About 6/6—U. S. Eng., 536 South Clark St., Chicago 5, Ill., 2 story, 33,500 sq. ft., 3 unit, 600 man, concrete frame, masonry RESERVE CENTER, 3-bay, 1 story, 3,800 sq. ft., steel, MAINTENANCE SHOP, exterior facilities, ENG-11-032-61-83. Approx. $700,000.

† **Ill., Rock Island**—BA 6/13—U. S. Eng., 1819 Pershing Rd., Chicago, POWER DISTRIBUTION REHABILITATION, Rock Island Arsenal, 61-77. $800,000. CD 5/10/61.

O., Athens—BA 6/22—Dpt. P. Wks., State Depts. Bldg., Columbus, Zone 15, DORMITORY No. 4, Ohio University. $646,000. Plans deposit $50. Potter, Tyler, Martin & Roth, 128 E. 6th St., Cincinnati, archts. CD 2/27/61.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., State Dpts. Bldg., Columbus, Zone 15, Bids opened 5/9, ROADS,

O.—**L. R. Skelton**, 3099 Sullivant Ave., Columbus, O., LB $1,192,250, est. $1,352,800, relocation SR 3 near junction with USR 30 at south edge of Wooster, Proj. 265, Wayne Co.;

O.—**E. K. Bridge Constr. Co.**, 2416 Byrne Rd., Toledo, O., LB $445,990, est. $538,000, addition of two lanes to USR 21 from near SR 5 southward 3 mi., Proj. 261, Summit and Wayne Counties;

O.—**Visintine & Co.**, 1315 Edgehill Rd., Columbus, O., LB $1,810,000, est. $1,884,600, constr. 1.26 mi. four-lane relocation USR 21 in Massillon, Proj. 260, Stark Co.;

O.—**Alleghany Contr. Industries**, 801 Bingham St., Pittsburgh, Pa., LB $3,821,877, est. $4,243,400, constr. of Lakeland Freeway from Newell St. to Grand River in Plainesville, Proj. 254, Lake Co.;

O.—**A. J. Baltes, Inc.**, 11 Olive St., Norwalk, O., LB $4,941,063, est. $5,613,300, constr. three mi. Cleveland East Outerbelt (SR 1 and IR 271) in Pepper Pike, Woodmere, Beachwood and Orange, Proj. 251, Cuyahoga Co.;

O.—**Foley Constr. Co.**, 5050 Orchard St., Cincinnati 12, O., LB $1,443,202, est. $1,887,000, relocation 5 mi. SR 74 from Clermont-Hamilton County Line, Proj. 250, Clermont Co. CD 4/9/61.

▲ **OHIO**—State Hy. Dpt., State Depts. Bldg., Columbus, Zone 15, Bids opened 5/9, BRIDGES,

O.—**Condon Cunningham of Omaha Nebraska**, 739 S. James Rd., Columbus, O., LB $314,013, est. $298,500, culvert and drainage imprvs. on USR 52, Proj. 266, Adams, Brown and Clermont Counties;

O.—**Ohio Engineering Co.**, 1945 E. 28th St., Lorain, O., LB $521,449, est. $562,400, replacement of railroad underpass at SR 303 and SR 76 in Belden, widening and resurfacing SR 76 southward approx. 3 mi., Proj. 255, Lorain and Medina Counties. CD 4/19/61, under Streets and Roads.

INDIANA—State Hy. Dpt., State Office Bldg., Indianapolis, ROADS,

Olinger Constr. Co., Olinger Bldg., Box 96, Huntingburg, Ind., CA $605,537, c. conc. pvt., Contract R-5230, Gibson Co. BA 3/14/61. CD 3/17/61, under LB.

WISCONSIN—State Hy. Comn., Rm 535, State Office Bldg., Madison, ROAD,

Linnan Constr. & Engineering, Inc., 16500 Pheasant Dr., Brookfield, Wis., CA $536,140, grading, base conc. pavement, Structures B-40-123 and B-49-124, 0.428 mi. West National Ave. (West Expressway-West Lincoln Ave. and West Expressway) (West National Ave. Overpass) Proj. U-015-2(5) and I-894-7(5) 305, STH 15 and I Hy. 894, Milwaukee Co., BA 3/28/51. CA 5/5/61. CD 4/6/61, under LB.

BUILDINGS—LB & CA

▲† **Malan Constr. Corp.**, 2 Park Ave., New York, N. Y., LB $14,790,000, (3 bidders), 800 bed G. M. & S. HOSPITAL and Regional OFFICE MEDICAL CLINICS, Veterans Admin., E. 105th St. and E. Blvd., Wade Park, CLEVELAND, O. Veterans Admin., Munitions Bldg., Wash., D. C. BA 5/9/61. CD 3/7/61.

▲ **Ludwig Zahn**, 55 E 4th St., Mansfield, O., CA Est. $1,000,000, 105 unit Holiday Inn MOTEL, Mansfield Expressway and Laver Rd., MANSFIELD, O. Miffin-Rich, Inc., 3774 Cazassa Rd., Memphis, Tenn.

▲ **Gross Pointe Homes**, 12067 Pleasant Valley Rd., Cleveland, O., Owner Builds, $2,100,000, 100 HOMES W. 119th St. and Gross Dr., PARMA, O. CD 1/30/61.

▲ **Omega Constr. Co.**, 2435 Eastern S. E., Grand Rapids, Mich., LB $2,536,871, (5 bidders), SENIOR HIGH SCHOOL, FRANKFORT, IND. Community Schools of Frankfort, Ind., Units 1, 2, 3 and 4; and Frankfort Community School Bldg. Corp. Units 5, 6, 7 and 8, Frankfort, Ind. Louis C. Kingscott & Assocs., 401 Hanna Ave., Indianapolis, Ind., archts.-engrs. CD 3/30/56.

▲ **S. N. Nielsen Co.**, 3059 West Augusta Blvd., Chicago, Ill., CA Est. $30,000,000, ELECTRIC GENERATING PLANT, Bailey Generating Station, Lake Michigan, GARY, IND. Northern Indiana Public Service Co., 5256 Hohman St., Hammond, Ind. CD 2/5/60, under Ind., Hammond.

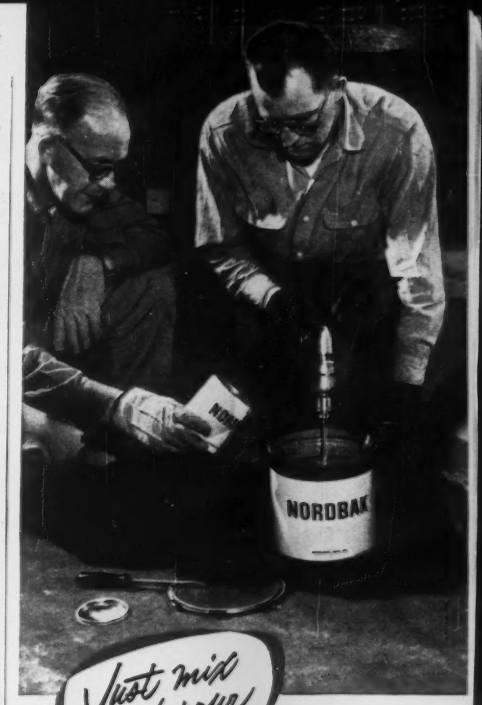
▲ **Wm. Stern & Son**, 544 Pierce, Gary, Ind., CA Est. $1,000,000, DEPARTMENT STORE ADDN., GARY, IND. H. Gordon & Sons, 801 Broadway, Ind. BA 3/1/61. CD 3/2/61

▲ **M. A. Lombard & Son Co.**, 1215 West 103rd St., Chicago, Ill., CA $1,174,174, DORMITORY, CHICAGO, ILL. Mundelein College, 6363 North Sheridan Rd., Chicago, Ill. BA 4/25/61. CD 4/12/61.

O'Brien Co., 810 South Tripp Ave., Chicago, Ill., LB $605,716, est. $500,000, (7 bidders), general contract Jos. Brennemann SCHOOL, Clarendon Ave. and Robbins Court, CHICAGO, ILL. Bd. Educ., 228 North La Salle St., Chicago, Zone 1, Ill. BA 5/8/61. CD 5/1/61.

▲ **Turner Constr. Co.**, 150 East 42nd St., New York, Zone 17, N. Y., CA two 3 story, 83,000 sq. ft. steel, concrete, brick DORMITORIES, 2 story, 23,000 sq. ft. brick, aluminum and glass CHAPEL with 60 ft. stainless steel spire, 3 story, 19,000 sq. ft. CLASSROOM ADDN., GLEN ELLYN, ILL. Maryknoll Seminary, Roosevelt St., Glen Ellyn, Ill. Marginnis & Walsh & Kennedy, 126 Newbury St., Boston, Mass., archts.

(Continued on page 207)



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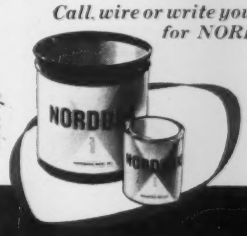

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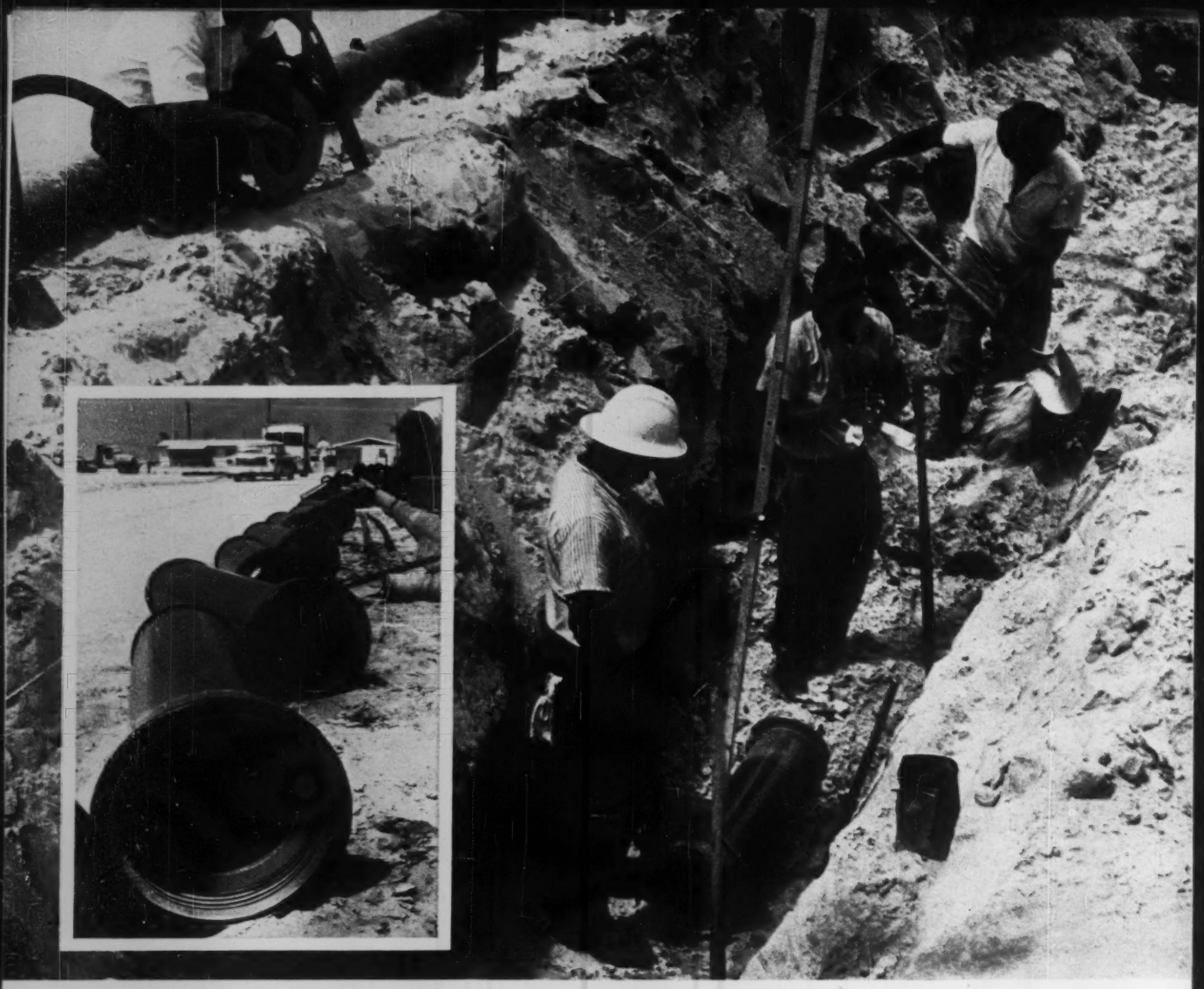

OWNER: Palm Springs Utilities, Palm Springs, Florida
ENGINEER: Brockway, Weber & Brockway

PROJECT: Village Sewage System
CONTRACTOR: Hillier Excavation & Construction Co.

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(Continued from page 205)

▲ **Ragnar Benson Co.**, 4744 West Rice St., Chicago, Ill., CA Est. **$2,000,000**, PAINT and RESIN MANUFACTURING PLANT, NORTHLAKE, ILL. Tousey Varnish Co., 520 West 25th St., Chicago, Ill. CD 4/27/61.

Jordan-Jefferson, Inc., 412 W. Silver Spring Dr., Milwaukee, Wis., CA Est. **$600,000**, 2 story, 135 x 140 ft. OFFICE, MILWAUKEE, WIS. Gibraltar Corp., 412 W. Silver Spring Drive, Milwaukee, Wis.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

May 24 Arkansas, Oklahoma — May 25 Wyoming
May 26 Missouri

STREETS AND ROADS

May 23 Colorado, Iowa — May 24 Arkansas
May 25 Wyoming — May 26 Missouri, New Mexico
June 1 Kansas

Mo., St. Louis—BA 6/6—City, Bd. P. Service, 304 City Hall, Zone 3, two SERVICE BLDGS., one 1 story, 81x161 ft. and 81x120 ft. brick, masonry blocks, steel, concrete, etc.; other 1 story, 50x240 ft. prefabricated rigid frame steel, service yard fence, paving, drainage at Chain of Rocks Water Works Plant. $500,000. Fitch & Nicholas, 5507 Pershing Ave., Zone 12, archts. Boyd & Petry, 2001 Big Bend Rd., Zone 17, struct. engrs. Wm. Tao, 3608 S. Grand, Zone 18, mech. engr. CD 7/11/60.

Minn., Fridley—BA 6/8—City, City Hall, SEWER and WATER IMPRV. PROJ. 70,800 lin. ft. sewer lines and 57,600 ft. water lines. $750,000. Comstock & Davis, Inc., 1446 County Rd. J, Minneapolis, Minn., engrs. Bids 5/1 rejected, LB **$859,771.** CD 5/4/61, under LB.

BUILDINGS—BA

Wyo., Lovell—BA 6/7—School Dist. No. 3, Lovell, HIGH SCHOOL. $596,000. Plans deposit $50. Drake & Gustafson, 1935 Grand Ave., Billings, Mont., archts. CD 11/16/60.

BUILDINGS—SLC

▲ **Minn., Bloomington (P.O. Minneapolis)**—Control Data Corp., 501 Park Ave., Minneapolis, soon lets contract 3 story, 100,000 sq. ft. ENGINEERING LABORATORY and OFFICE near Hy. 100, 34 Ave. S. (Old Shakopee Rd.). $1,500,000. Community Planning & Design Assocs., 2635 University Ave., St. Paul, archts. J. T. Baker & Assoc. Engrs., 1835 University Ave., St. Paul, Minn., engrs. CD 4/26/61.

Minn., St. Paul — Maternity of the Blessed Virgin Catholic Church, Dale St. and Arlington Ave., soon lets contract CHURCH. $500,000. Dreher, Freeks, Sperl & Flynn, Inc., 1520 St. Clair Ave., archt..

Minn., St. Paul—St. Odilla's Parish, 3495 N. Victoria St., soon lets contract CHURCH, SCHOOL, incl. GYMNASIUM, Harriet Ave. and N. Victoria St. $550,000. Kehne & Carmody, 7803 Southtown Center, Minneapolis, Minn., archts. Bruch & Morrow, Inc., 1645 Hennepin Ave., Minneapolis, engr. CD 8/23/60.

HEAVY CONSTRUCTION—LB & CA

Abell-Howe Co., 1114 Shaver Rd. N. E., Cedar Rapids, Iowa, LB **$530,000**, PARKING STRUCTURE, CEDAR RAPIDS, IOWA. City, City Hall, Cedar Rapids, Iowa. BA 4/26/61. CD 8/18/55.

Gjellefald Assocs., Inc., Box 11, Forest City, Iowa, CA **$884,553**, Sections I and VI, SEWERS, SIOUX CITY, IOWA. City, City Hall, Sioux City, Iowa. BA 4/10/61. CD 4/25/61, under LB.

† **Massman Constr. Co.**, 3917 Broadway, Kansas City, Mo., LB **$505,036**, est. $484,813, (5 bidders), constr., repair DIKES and REVETMENT, Missouri River, Bluffport to Rocheport Reaches, Mile 226.8 to 180.4, Boonville, CIVENG 230028-61-51, MISSOURI. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. BA 5/2. CD 3/30/61.

† **U. S. Eng.**, Box 1600, Fort Worth, Tex., cancelled bids to have been opened Apr. 27, RELOCATION OF ST. LOUIS & SOUTHWESTERN RAILWAY, Waco Reservoir, ENG-41-443-61-77, TEXAS. **$500,000.** CD 3/21/61.

▲† **Utah Constr. & Mining Co.**, 550 California St., San Francisco, Calif., CA **$5,918,221**, EXCAVATION of Norad Combat Operation Center, (NORAD), ENG-25-066-61-41, COLORADO SPRINGS, COLO. U. S. Eng., 6012 U. S. Post Office & Courthouse, Omaha, Neb. BA 5/2/61. CD 5/4/61, under LB.

BUILDINGS—LB & CA

Fischer & Frichtel, Inc., 8703 St. Charles Rock Rd., Overland 14, Mo., Owner Builds, **$500,000**, 1 story, 30,000 sq. ft. Union Plaza SHOPPING CENTER, parking areas, etc., Reavis Barracks and Union Rds., MEHLVILLE (ST. LOUIS 25 P.O.), MO.

Donald L. Bron, 9603 Kemper Rd., Kansas City, Mo., CA **$577,000**, 4 story two wing HIGH SCHOOL ADDN., MEXICO, MO. Bd. Educ. School Dist. of Mexico, Mexico, Mo. Butler & Assocs., 306 E. Broadway, Columbia, Mo., archts. BA 4/12. CD 11/9/60.

B. L. McGee Constr. Co., P.O. Box 782, Austin, Tex, LB **$797,000** Base Bid, ARTS & MUSEUM, AUSTIN, TEX. University of Texas, Main Admin. Bldg., Austin, Tex. BA 5/2/61. CD 4/5/61.

Cantrell & McMillan, Builders, Inc., 5348 Inker St., Houston, Tex., Owner Builds, **$720,000**, 20 DWELLINGS, 13000 Memorial Drive, HOUSTON, TEX.

▲ **F & C Engineering Co.**, Box 74, Houston, Tex., (Branch of Farnsworth & Chambers Co.), CA Est. **$1,100,000**, 10 story, masonry, Sharpstown State BANK, Sharpstown Center, HOUSTON, TEX. Frank W. Sharp, c/o Sharpstown Center, Oak Forest State Bank Bldg., Houston, Tex. CD 3/16/59.

Rob. H. Smith & Co., 1915 Kolfahl St., Houston, Tex, CA **$778,000**, Unit 2, RESEARCH CENTER, PORT ARTHUR, TEX. Texaco, Inc., 401 W. 19th St., Port Arthur, Tex. CD 6/23/60.

▲ **Wm. Matera**, 2616 Bandera Rd, San Antonio, Tex., CA **$1,640,000**, MEN'S DORMITORY, WOMEN'S DORMITORY, STUDENT UNION, SAN MARCOS, TEX. Southwest Texas State College, Bd. Regents, San Marcos, Tex. BA 4/18/61. CD 4/26/61, under LB.

Foothills Holding Corp., 5801 West 52nd St., Arvada, Colo., Owner Builds, **$800,000**, 50 one story, brick RESIDENCES, ARVADA, COLO.

▲ **Green Acres Development Co.**, 1759 South Pearl, Denver, Colo, Owner Builds, **$1,600,000**, 100 RESIDENCES, LAKEWOOD, COLO.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

June 7, 8 California

STREETS AND ROADS

May 25 Nevada — June 7, 8, 14, 22 California

▲† **Washington**—BA 5/24—U. S. Eng., City-County Airport, Walla Walla, first-stage co. LOWER MONUMENTAL LOCK and DAM, ENG-45-164-61-45, $3,000,000. Extended date. CD 4/20/61.

BUILDINGS—BA

Calif., Mountain View—BA About 6/1—Mountain View Union High School Dist., P.O. Box 1087, Mountain View HIGH SCHOOL REHABILITATION. $500,000. Ernest J. Kump, 325 Lytton Ave., Palo Alto, archt. CD 3/2/60.

▲ **Calif., San Diego**—BA 6/5—Bd. Supervs. San Diego Co., Rm. 306, Civic Center Bldg., Zone 1, 6 story 140,000 sq. ft. steel frame COURTHOUSE ADDN. $3,387,503. Plans deposit $8. CD 11/23/59.

▲† **Nev., Mercury**—BA 6/6—Atomic Energy Comn., 1233 S. Main St., Las Vegas, TEST CELL D COMPLEX, buildings and utilities, Nevada Test Site, $1,200,000. Aetron, Div. Aerojet-General Corp., 410 N. Citrus Ave., Covina, Calif., archts.-engrs. CD 11/11/60.

▲† **Idaho, Arco**—BA 7/24—Atomic Energy Comn., Idaho Operations Office, Idaho Falls, PROTOTYPE ORGANIC-COOLED NUCLEAR POWER PLANT, National Reactor Testing Center. CD 12/23/59.

HEAVY CONSTRUCTION—LB & CA

▲† **ALASKA**—Bureau P. Rds., Dpt. Commerce, P.O. Box 1961, Juneau, ROAD,
Green Constr. Co., Box 1091, Juneau, Alaska, CA **$2,165,274**, clearing, grubbing, grading, drainage and surf. 11.057 mi. Mitkof Hy. from Blind Slough to Dry Strait, Proj. Nos. S-0937(5) and FH 7-1(1) 2(1). BA 3/21. CD 3/29/61, under LB.

† **IDAHO**—Bureau P. Rds., 914 West Jefferson St., Boise, ROADS,
Aslett Constr. Co., Box 799, Twin Falls, Idaho, CA **$504,462**, grading and bridge on Wayan-Freedom Hy., Caribou National Forest, Caribou Co. BA 4/28/61. CD 5/8/61, under LB.

† **WASHINGTON**—Bureau P. Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore.,
Hamer Corp., Box 428, Roseburg, Ore., CA **$519,838**, grading, surf. 4.703 mi. Randle-Yakima Hy., Lewis Co. BA 4/28/61. CD 5/4/61, under LB.

Taylor Utilities Constr. Co., 20026 Whitman Ave. N., Seattle, Wash., CA **$547,000**, WATER PIPE LINE, ABERDEEN, WASH. City, City Hall, Aberdeen, Wash. BA 4/26/61. CD 5/3/61, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, ROAD,
Harm Bros., 4261 Stockton Blvd., Sacramento, Calif., CA **$1,135,199**, grading, surf. to constr. 1.9 mi. 2 and 4 lane Hy. US 40 alternate between 2.3 mi. and 0.4 mi. south of Oroville, Butte Co. BA 4/26. CD 4/28/61, under LB.

CALIFORNIA—State Div. Hys., 1120 N St., Sacramento, ROAD,
Fredrickson & Watson Constr. Co., 873 81 Ave., Oakland, Calif., CA **$504,269**, grading, surf. Ventura Freeway (US Hy. 101) at Borchard Rd. interchange and on frontage roads and constr. or wid'n. bridges, Ventura Co. BA 4/26. CA 5/9. CD 5/5/61, under LB.

CALIFORNIA—State Div. Hys., 1120 N St., Sacramento, ROAD,
Ransome Co., 4030 Hollis St., Emeryville, Calif., CA **$568,000**, grading, paving 3.9 mi. US Hy. 99 to constr. two new southbound lanes to provide 4 lane freeway between Cottonwood and 0.1 mi. north of Bruce Dr., Shasta Co. BA 4/26. CA 5/8. CD 5/3/61, under LB.

▲† **Matt J. Zaich Co.**, 6828 Farmdale Ave., North Hollywood, Calif., CA **$4,396,821**, est. $4,205,071,

(Continued on page 209)

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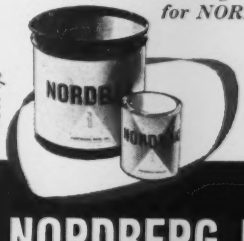

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(Continued from page 207)

Benedict Canyon CHANNEL, Cattaraugus Ave. to Ballona Creek, Los Angeles County Drainage Area, CIVENG-04-353-61-20B, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. BA 4/26. CA 5/9. CD 5/4/61, under LB.

Massey Sand & Rock Co., c/o Chutuk Constr. Co., Box 487, Indio, Calif., CA **$999,926**, Proj. 567 and 568, West Pomona STORM DRAIN and South Pomona STORM DRAIN, Pomona, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. BA 4/28. CA 5/9. CD 5/3/61, under LB.

Vinnell Corp. & Ukropina-Polich-Kral, 1145 Westminster Ave., Alhambra, Calif., CA **$856,491**, Proj. 443, North Inglewood STORM DRAIN, Inglewood, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. BA 4/21. CA 5/9. CD 4/26/61, under LB.

Baldwin Constr. Co., Box 311, Marysville, Calif., LB **$540,930**, (7 bidders), SEWAGE TREATMENT PLANT, ROSEVILLE, CALIF. City, City Hall, Roseville, Calif. Dewante & Stowell, 5709 Freeport Blvd., Sacramento, Calif., engrs. CD 12/4/59.

A. J. Raisch Paving Co., 900 W. San Carlos St., San Jose, Calif., CA **$537,711**, (6 bidders) RUNWAY and TAXIWAY EXTENSION, STORM DRAINAGE FACILITIES, San Jose Municipal Airport, SAN JOSE, CALIF. City, City Hall, San Jose, Calif. BA 4/12, CA 5/2, CD 4/24/61, under LB.

Hane Constr. Co., 2400 E. 70 St., Long Beach, Calif., LB **$560,496** (7 bidders), Santa Ana-Delhi CHANNEL and Santa Ana Gardens CHANNEL, Costa Mesa, SANTA ANA, CALIF. Orange County Flood Control Dist., 400 W. 8 St., Santa Ana, Calif. BA 5/3. CD 4/6/61.

† **James W. Glover, Ltd.**, P.O. Box 235, Honolulu, Hawaii CA **$796,000**, Increments II and RUNWAY 4F-22L, RUNWAY 11-29, TAXIWAYS 1, 3 and 4, DRAINAGE, etc., Increment III, b. conc. PARKING APRONS, etc., Barber's Point, NBy 32368, HONOLULU, HAWAII. 11th Naval Dist., Fleet Post Office No. 128, San Francisco, Calif. BA 3/29. CD 4/10/61, under LB.

BUILDINGS—LB & CA

▲ **Church of Jesus Christ of Latter-day Saints**, 47 East South Temple, Salt Lake City, 1, Utah. Owner Builds, **$2,000,000**, 258,540 sq. ft. GENEALOGICAL RESEARCH CENTER, SALT LAKE CITY, UTAH. Jackson & Sharp, 457-3rd East St., Salt Lake City 11, Utah, archts.

▲ **Cawdrey & Vemo, Inc.**, 3601 Fremont Ave., Seattle, 3, Wash., LB **$1,440,356**, (9 bidders), RESIDENCE HALL, SEATTLE, WASH. Seattle University, Broadway and Madison St., Seattle, Wash. BA 5/9/61. CD 4/19/61.

▲ **G. E. Teufel Co.**, 7329 4th Ave. S., Seattle, Wash., CA Est. **$1,000,000**, 1 story, 120,000 sq. ft., steel frame WAREHOUSE and OFFICE, in Andover Industrial Park at Tukwila, SEATTLE, WASH. General Electric Co., 1 River Rd., Schenectady, N. Y. BA 4/26/61. CD 4/12/61.

H. S. Wright Constr. Co., 414 Pontius Ave. N, Seattle, Wash., CA Est. **$550,000**, 52,000 sq. ft. WAREHOUSE and LABORATORY, SEATTLE, WASH. C. D. Stimson Co., White-Henry-Stuart Bldg., Seattle, Wash. Minneapolis-Honeywell Regulator Co., lessee. CD 12/28/60, under Minneapolis-Honeywell Regulator Co., as owner.

▲ **R. C. Mahon Co.**, Mound Rd. and Van Dyke St., Detroit, Mich., CA Est. **$3,000,000**, 22,000 sq. ft. gold-anodized Kaiser aluminum DOME for shopping center, stores, bowling alley, parking area, near BELVEDERE, CALIF. Harbor Point Assocs., c/o John Bolles, archt., 14 Gold St., San Francisco, Calif. (Mahon is licensed fabricator for dome erection by Kaiser Aluminum & Chemical Corp., Kaiser Center, 300 Lakeside Dr., Oakland 12, Calif.).

E. A. Raulston, 4100 W. Commonwealth, Fullerton, Calif., Owner Builds, **$676,500**, 41 stucco DWELLINGS, Sherwood, Hartford, Bedford Drs., Tract 3621, FULLERTON, CALIF.

Warde & Higginbotham, 142 N. Cypress Ave., Orange, Calif., CA **$629,850**, ADDNS. to Peters, Lampson and Walton SCHOOLS, GARDEN GROVE, CALIF. Garden Grove School Dist., 11363 E. Stanford Ave., Garden Grove, Calif. CD 3/29/61, under LB.

Ernest W. Hahn, Inc., 219 S. Hawthorne Blvd., Hawthorne, Calif., LB **$751,154**, est. $500,000, (9 bidders), Phase 1, 54,000 sq. ft. SHOPPING CENTER, 3 St. and Fairfax Ave., LOS ANGELES, CALIF. University of Southern California, 3551 University Ave., Los Angeles 7, Calif. BA 5/4. CD 4/21/61.

Joe Karren Co., 505 34 St., Oakland, Calif., CA **$900,000**, 3 story, penthouse 71 unit, APARTMENT, 200 Fairmount Ave., OAKLAND, CALIF. Fairmount Towers Apartment, c/o contractor. Cecil S. Moyer, 339 15 St., Oakland, Calif., archt.

▲ **First National Realty & Constr. Corp.**, 630 Third Ave., New York 17, N. Y., Owner Builds, **$50,000,000**, RESIDENTIAL COMMUNITY, incl. 250-room HOTEL, 1 and 2 story 600 CO-OPERATIVE APARTMENTS, 400-1 family HOMES, 18-hole GOLF COURSE, 440 acres, PALM SPRINGS, CALIF. Wexler & Harrison, 557 South Palm Canyon Dr., Palm Springs, Calif., archts. Wm. F. Bell, 544 Sierra Vista, Pasadena, Calif., archt. for Golf Course.

▲ **Perini Corp.**, 255 California St., San Francisco, Calif., CA **$3,318,000**, DISTRIBUTION CENTER, incl. 40,000 ft. frozen food warehouse, 175,000 sq. ft. perishable goods warehouse, 94,000 sq. ft. bakery; 4,800 ft. administration bldg., 8500 ft. box shed, Hoffman Blvd. and South 15 St., RICHMOND, CALIF. Safeway Stores, Inc., Industrial Div., 4 and Madison Sts., Oakland, Calif. BA 4/26. CD 4/4/61.

▲ **E. A. Corum & Son**, 4699 24 St. Rd., Sacramento, Calif., Owner Builds, **$1,000,000**, 65 unit Mansion Inn MOTEL, parking, 15th and H Sts., SACRAMENTO, CALIF. Dreyfuss & Blackford, 2127 J St., Sacramento, Calif., archts. CD 3/15/57.

▲ **Swinerton & Walberg Co.**, 1733 Webster St., Oakland, Calif., CA Est. **$3,000,000**, 1 story tilt-up concrete walls, steel columns etc. GLASS CONTAINER PLANT, near TRACY, CALIF. Owens-Illinois Glass Co., 350 Sansome St., San Francisco, Calif. BA 4/12. CD 3/28/61.

Wm. C. Crowell Co., 170 E. California Ave., Pasadena, Calif. CA **$587,900**, 1 story, reinforced masonry Merlinda SCHOOL, Valanda Ave., WEST COVINA, CALIF. West Covina Unified School Dist., 1717 West Merced Ave., West Covina, Calif. BA 4/25, CA 5/3. CD 5/4/61, under LB.

Alfred Leone, 7100 Hillside Ave., Los Angeles, Calif., Owner Builds, **$600,000**, 7 story, stucco, brick APARTMENT, 7100 Hillside Ave., LOS ANGELES, CALIF. Robert E. Doland, 1241 N. Poinsettia Pl., Los Angeles, Calif., archt.

Wm. J. Moran Co., 1011 South Fremont Ave., Alhambra, Calif., CA **$500,000**, 40,000 sq. ft. PLANT ADDN., MOUNTAIN VIEW, CALIF. Fairchild Semiconductor Corp., 545 Whisman Rd., Mountain View, Calif. CD 12/8/59.

† **Sheldon L. Pollack Constr. Corp.**, 5880 West Peco Blvd., Los Angeles, Calif., LB **$551,964**, (4 bidders), INERT PARTS BLDG. and covered concrete LOADING DOCKS for Air Material Command, Nimbus Station, NIMBUS, CALIF. Aetron, Div. Aerojet-General Corp., P. O. Box 1947, Sacramento, Calif. CD 2/10/56.

Anderson & Robinson Mechanical Constructors, Inc., 2541 State St., Carlsbad, Calif., CA **$649,994**, combined mechanical work GENERAL STATE OFFICE BLDG. for State Dpt. Finance, W.O.3848GC-5, SAN DIEGO, CALIF. State Dpt. P. Wks., 1120 N St., Sacramento, Calif. BA 4/26, CA 5/2. CD 5/4/61. under LB.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
May 24 British Columbia

BUILDINGS—BA

▲ **Man., Winnipeg**—BA 5/31—Manitoba Cancer Foundation, 700 Banantyne Ave., CANCER CLINIC. $1,700,000 Plans deposit $100. Smith, Carter, Searle Assocs., 65 Dewdney Ave., archts. CD 7/19/60.

HEAVY CONSTRUCTION—LB & CA

Dawson, Wade & Co., Ltd., 775 Clark St., and Peter Kiewit Sons Co. of Canada Ltd., 1587 West 8th St., Vancouver, B.C., CA **$805,881**, SNOW SHEDS, Glacier National Park, GLACIER PARK, B.C. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. BA 3/2/61. CD 4/4/61, under LB.

ONTARIO—Dpt. Hys., Parliament Bldgs., Downsview, ROAD,

Donald J. MacDonald Constr. Ltd., 1179 Kennedy Rd., Scarborough, Ont., CA **$827,840**, grading, drainage, structures 5.3 mi. Hy. 401, Aultsville Rd., easterly, Contr. 61-60, Ottawa. BA 4/19/61. CD 4/27/61, under LB.

BUILDINGS—LB & CA

Bird Constr. Co. Ltd., 12525 127th Ave., Edmonton, Alta., CA **$602,398**, steel, concrete city POLICE HEADQUARTERS, EDMONTON, ALTA. City, City Hall, Edmonton, Alta. CA 5/1/61. CD 5/3/61, under LB.

Foundation Co. of Canada Ltd., 221 Bonnie Doon Shopping Centre, Edmonton, Alta., LB **$566,675**, (12 bidders), rein.-con. Sacred Heart SCHOOL, EDMONTON, ALTA. Edmonton Separate School Bd., 9807 106th St., Edmonton, Alta. BA 4/21/61. CD 4/13/61.

▲ **Canadian Engineering & Contg. Co., Ltd.**, P.O. Box 739, Hamilton, Ont., CA **$1,238,725**, HIGH SCHOOL ADDN., OAKVILLE, ONT. Oakville-Trafalgar Dist. High School Bd., 155 Kerr St. N., Oakville, Ont. BA 4/20/61. CD 3/28/61.

PUERTO RICO

BUILDINGS—LB & CA

▲† **Coite-Sommers Co.**, Vidalia, Ga., LB **$1,563,956**, (3 bidders), Base Bid and additives, 100 unit CAPEHART HOUSING Fort Buchanan, ENG-08-123-61-70, SAN JUAN, PUERTO RICO. U. S. Eng., Box 4970, Jacksonville, Fla., U.S.A. BA 5/9. CD 3/27/61.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Peru, Lima**—Blds Asked—Ministry of Development & P. Wks., Lima, ROAD,
37 mi. section Pucallpa-Aguaytia Hy. $2,500,000. Bidders must prequalify. CD 12/3/59.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **United Arab Republic** — BA 6/15 — United Arab Republic, Managing Director, Planning & Research Dpt., Suez Canal Auth., Ismailia, Egypt, DREDGING and REVETMENT southern region Suez Canal between Small Bitter Lake and Port Tewfik. Plans deposit $140. CD 1/20/60.

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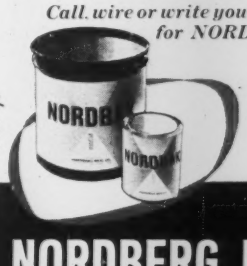

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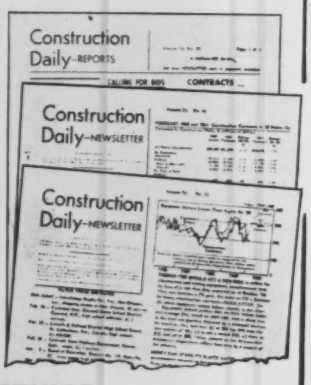

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Name of Company .....
Type of Business .....
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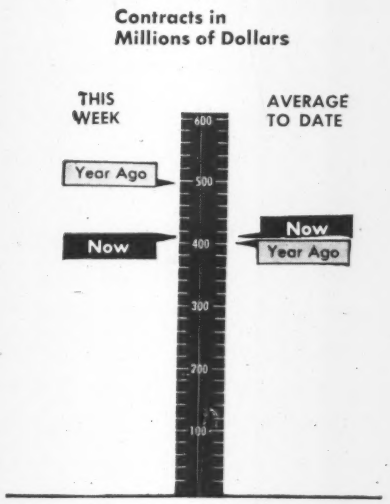
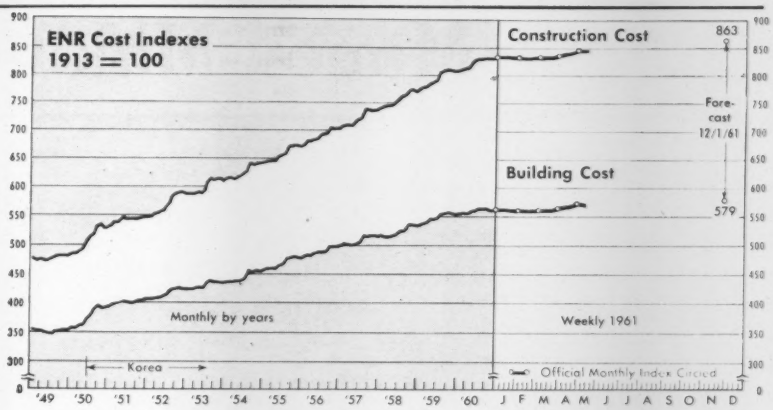
Construction Scoreboard

This Week . . .




ENR Cost Indexes 1913 = 100
Construction Cost
863
Fore-cast 12/1/61
Building Cost
579
Monthly by years
Weekly 1961
Korea
Official Monthly Index Circled
'49 '50 '51 '52 '53 '54 '55 '56 '57 '58 '59 '60
J F M A M J J A S O N D

ENR INDEXES (1913=100), 20-cities' average	Week of May 11 1961	% Change from Apr 13 1961	% Change from May 12 1960
Construction Cost	848.68	+1.0	+3.2
Building Cost	569.17	+0.3	+1.9

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

AMOUNT OF CONTRACTS LET

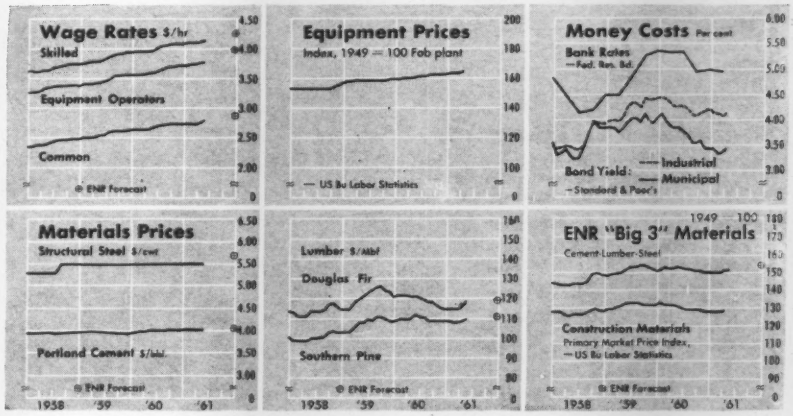
Contracts Awarded In 50 States By Type	This Week millions	Cum. 20 wks 1961	Chge '60-'61 %
All Heavy Construction	$410.7	$8,138.3	+ 1
By Ownership			
PRIVATE	259.5	4,137.3	− 5
PUBLIC	151.2	4,001.0	+ 7
State & Municipal	118.6	3,082.2	+ 8
Federal	32.6	918.8	+ 6
By Type of Work			
PUBLIC			
Waterworks	5.3	145.7	−18
Sewerage	16.7	279.4	+37
Bridges*	10.7	224.4	−35
Highways	50.2	1,381.2	+21
Earthwork, Dams & Waterways	8.8	311.6	+17
Buildings:			
Excl. Housing	27.1	919.7	+ 4
Housing	12.6	277.5	+37
Unclassified	19.8	461.5	− 8
PRIVATE			
Buildings:			
Mass Housing	107.0	1,790.6	−17
Commercial	71.5	923.1	+13
Industrial	62.0	1,236.0	+24
Unclassified	19.0	187.6	−50

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of May 11 millions	Cum. 19 wks 1961	Chge '60-'61 %
Corporate Securities	$ 79.7	$1,130.9	+10
State and Municipal:			
All Except Housing	127.6	2,281.2	−10
Housing	1.1	29.7	+118
Federal Loans	3.7	78.5	+25
Federal Aid	0	0	−100
Total Nonfederal	$212.1	$3,520.3	−45
Federal Appropriations:			
Projects in U. S.	0	1.0	−99
Outside U. S.	0	0	−100
Total New Capital	$212.1	$3,521.3	−46



ENR COST INDEXES IN 22 CITIES, 1913=100

City	Construction Cost May 1961	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost 1961	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	658.22	+0.8	+3.9	511.77	+1.5	+2.8
Baltimore	759.18	0	+0.6	562.90	0	+1.5
Birmingham	679.81	−0.8	+4.0	532.82	+1.0	+2.9
Boston	866.87	+0.5	−2.9	583.86	+1.3	+3.3
Chicago	910.55	+0.1	−1.1	585.61	+0.2	+0.3
Cincinnati	846.69	0	+3.9	552.47	0	+2.3
Cleveland	947.21	+0.1	+0.3	564.36	−0.2	+0.5
Dallas	640.32	0	+1.7	530.30	+0.6	+2.1
Denver	781.22	+3.3	+3.8	555.69	0	+3.0
Detroit	984.14	+2.1	+4.2	611.75	+1.1	+2.1
Kansas City	837.88	0	+4.9	561.98	0	+1.1
Los Angeles	944.20	+4.7	+8.5	572.11	+1.8	+1.9
Minneapolis	912.84	+1.7	+6.1	586.65	+1.9	+3.0
New Orleans	658.08	+0.6	+2.1	515.07	+1.4	+0.1
New York	1,060.06	−0.06	+4.9	664.22	−0.09	+3.0
Philadelphia	840.49	+1.2	+1.8	593.28	+0.6	+1.8
Pittsburgh	885.14	0	+3.2	625.80	0	+2.8
St. Louis	920.86	+2.2	+4.4	586.06	−0.8	+0.9
San Francisco	925.70	+4.7	+4.5	566.91	+1.0	+3.2
Seattle	887.25	+2.4	+3.2	515.35	+0.4	+1.9
U. S.—20 Cities' avg.	847.32	+1.2	+3.3	568.99	+0.7	+2.0
Montreal	648.79	0	−0.2	464.48	0	−0.3
Toronto	695.93	+1.2	−0.2	498.06	+1.7	+0.2

The Money-Makers (and Some

COMPANY	GROSS REVENUES (thousands—000 omitted) '60	'59	% Change '59-'60	NET PROFIT (LOSS) (thousands—000 omitted) '60	'59	% Change '59-60	% PROFIT MARGIN on Gross Revenues '60	'59
All-State Properties, Floral Park, N. Y.	$10,315a	$3,312a	+211	$1,180	$127	+827	11.4	3.8
fiscal 6 months ending 12/31	not stated	not stated		199	not stated			
Arundel Corp, Baltimore	59,279	45,247	+31	1,510	2,523	−40	2.5	5.5
construction only	47,662	33,778	+41	.....	.....			
Arvida Corp., Boca Ratan, Fla	23,456b	16,512b	+42	1,754	3,530	−50	7.5	21.4
Bank Building Corp. of America, St. Louis	28,577	23,052	+24	1,183	1,209	− 2	4.1	5.2
BarChris Construction Corp., NYC	9,165	3,320	+176	868	201	+332	9.4	6.1
Blaw-Knox Co., Pittsburgh	192,810	161,295	+20	4,247	5,831	−27	2.2	3.6
construction-engineering only (c)	38,000	32,000	+19					
Catalytic Construction Co., Philadelphia	40,021	34,495	+16	213	188	+13	.53	.54
Dravo Corp., Pittsburgh	99,376	92,661	+ 7	2,222	1,814	+22	2.2	1.9
Electronic & Missile Facilities, Inc. NYC	12,744	17,278	−26	201	167	+21	1.6	1.0
Fluor Corp., Ltd., Los Angeles	85,949d	110,398d	−22	786	(886)	....	0.9	loss
construction-engineering only	72,803	97,330	−25					
1st fiscal quarter ending 1/31/61	22,953	15,599	+47	343	(229)	....	1.5	loss
Singmaster & Breyer, Inc., NYC, division of Fluor	8,100e	3,900e	+107					
Ft. Pitt Bridge Works, Pittsburgh	7,558	13,673	−45	(653)	221	....	loss	1.6
Foster Wheeler Corp., NYC	170,770	163,653	+ 4	2,833	5,907	−52	1.7	3.6
Foundation Co., NYC	9,656	6,967	+39	(132)	1	....	loss	0.01
Frouge Corp., Bridgeport, Conn	7,579f	8,624f	−12	159	251	−37	2.1	2.9
George A. Fuller Co., NYC	4,757g	6,189g	−23	804	1,323h	−39	16.9	21.4
General Builders Corp., NYC	8,320	1,946	+337	522	(424)	....	6.3	loss
General Development Corp., Miami	56,152	67,237	−17	5,710	8,819	−35	10.2	13.1
housing sales revenue	15,673	10,559	+48					
Great Lakes Dredge & Dock Co., Chicago	21,575	21,692	− 1	3,150	3,253	− 3	14.6	15.0
Kaiser Industries Corp., Oakland, Calif.	192,095	179,529	+ 7	6,522	15,740	−59	3.4	8.8
Kaiser Engineers & International Divs.	48,154	33,304	+45					
Kansas City Structural Steel Co., K.C., Mo.	6,369	4,192	+52	162	(119)	....	2.5	loss
Koppers Co., Inc., Pittsburgh	303,727	242,930	+25	7,473	5,832	+29	2.5	2.4
construction-engineering only	72,105	27,381	+163					
Levitt & Sons, Inc., Levittown, N.J.	10,005j	14,032j	−29	(34)	411	....	loss	2.9
Lockwood, Kessler & Bartlett, Inc., Syosset, N.Y. (i)	2,130	2,367	−10	(84)	57	....	loss	2.4
Macco Corp., Paramount, Calif.	77,477	74,791	+ 4	(981)	1,405	....	loss	1.9
J. Ray McDermott & Co., Inc., Houston	43,237k	44,967k	+ 4	965	2,185	−56	2.2	4.9
F. H. McGraw & Co., Hartford	13,500	17,600	−23	(391)	(222)	....	loss	loss
Arthur G. McKee & Co., Cleveland	61,072	52,917	+15	2,443	3,675	−34	3.9	6.1
Merritt-Chapman & Scott Corp., NYC	355,578	436,182	−19	(29,714)	9,032	....	loss	2.1
construction only	131,000	191,000	−31					
Morrison-Knudsen Co., Inc., Boise	189,644	169,708	+12	4,525	5,889	−23	2.4	3.5
North American Contracting Corp., Washington, D.C.	1,956	662	+196	638	(194)	....	32.6	loss
Perini Corp., Framingham, Mass.	135,629	103,096	+32	1,490	718	+109	1.1	0.7
Raymond International, Inc., NYC	113,745	94,270	+21	1,646	5,123	−68	1.4	5.4
Starrett Bros. & Eken, Inc., NYC	308m	430m	−28	(17)	39	.....	loss	9.1
Stone & Webster, Inc., NYC	33,128	36,410	− 9	7,386	9,187	−19	22.3	25.2
construction-engineering only	11,530	14,753	−22					
Taylor International Corp., NYC	6,774	7,638	−11	(381)	275	.....	loss	3.6
Thompson-Starrett Co., Inc., NYC	13,950	13,126	+ 7	(654)	437	.....	loss	2.5
Tishman Realty & Constr. Co., NYC	18,378	18,043	+2	1,035	3,344	−69	5.6	18.5
Universal American Corp., NYC	68,660	31,739	+116	1,036	443	+134	1.5	1.4
construction subs. Paul Hardeman, Inc.	56,230	not stated						
Utah Construction & Mining Corp., San Francisco	69,179	75,072	− 8	9,134	8,362	+ 9	13.2	11.2
Warren Bros Co., Cambridge, Mas.	69,862	74,183	− 6	1,318	1,967	−33	1.9	2.7
Williams Bros., Co., Tulsa	58,630	27,499	+113	2,740	764	+259	4.7	2.8
Williams-McWilliams Industries, New Orleans	42,791	38,865	+10	306	280	+ 9	0.7	0.7
construction only	11,120	7,719	+44					

a) Fiscal year ending 6/30
b) Fiscal year ending 7/31
c) Company approximation, excludes $32 million in missile base contracts.
d) Fiscal year ending 10/31
e) Included in Fluor total
f) Fiscal 6 months ending 12/31/60
g) Gross profit. Contract income not stated
h) Excludes $1.1 million net profit on sale of a commercial complex
i) Consulting engineers
j) Fiscal 6 months ending 5/31
k) Fiscal 9 months ending 12/31
m) Net Fees. Contract volume not stated.

Losers): What the Reports Show

- **Profit margins declined last year for most of the publicly held construction companies.**
- **It was the same old villain: Tight competition forced bids to rock bottom.**
- **But some beat the market with profitable sidelines, specialties and negotiated contracts.**

By Robert J. Stinson

Those who own stock in construction companies now know the bad news officially. The annual reports show it in black and white—and sometimes red.

Profit margins fell last year under the weight of heavier competition for the available work. In most cases the trouble stemmed from bids that were too low; in some cases—particularly missile-base projects—the trouble was unanticipated costs.

Of the forty companies that make their balance sheets public, 28 had a worse year in '60 than in '59.

Those that came out of a year of recession in better shape than they went in did so by taking up profitable sidelines (such as land development), concentrating on a specialized market, taking more work on a negotiated basis, or slashing overhead costs.

Those are the general conclusions drawn from the annual reports of 41 publicly held companies and from the figures made available by Perini Corp., which has registered with the Securities and Exchange Commission—a first step before going public.

Here's the picture:

- Eighteen companies reported narrower profit margins.
- Nine that cleared a profit in '59 lost in '60.
- One that lost in '59 went deeper into the red.
- Nine increased their profit margins.
- Four earned a 1960 profit after losing in '59.
- One reported no change in profit margin.

Missile-base construction ate into the profits of at least five of these companies—Blaw-Knox, Raymond, Macco, Morrison-Knudsen, and Kaiser Engineers Division of Kaiser Industries. (A sixth company in missile work, Puget Sound Bridge & Dry Dock Corp., is a subsidiary of Lockheed Aircraft Corp.; it does not report separately from the parent, so its share of cost overruns isn't available.)

Blaw-Knox, with $31.9 million worth of missile-base contracts, reports cost overruns (costs in excess of the contract amount) of $8.6 million, of which $4.1 million was charged to 1960 and $4.5 million to 1959.

Kaiser, Raymond, Macco, and Puget Sound Bridge & Dry Dock, in joint venture, hold $75.4 million worth of contracts for three bases. Raymond's share of overruns is $7 million, of which $3.5 million was provided for in 1960's earnings. Macco provided for $2.95 million of its $5.9-million share of overrun. And Kaiser charged $1.7 million as its share of the missile-base overruns. (Henry J. Kaiser Co. and its operating divisions, Kaiser Engineers, Kaiser Engineers International, and Kaiser Sand & Gravel, showed a total loss of slightly more than $2 million. The sand and gravel unit operated at a profit, which places the loss onus on the construction operation.)

Heavy losses are continuing at these jobs. In its first quarter report for '61, Kaiser Industries told its stockholders that Kaiser Engineers Division lost another $1.7 million on its share of missile-base joint venture in the first three months. Moreover, Kaiser anticipates another $2.5 million in losses from the same projects by early 1962.

The others in the joint venture have not yet reported their share of losses this year at the sites.

Morrison-Knudsen placed no dollar sign on its missile-base overruns but reported, "the largest single factor" in its decreased 1960 earnings was the extra cost of frequent modifications in original designs of missile bases, and government's delay in making settlements.

All of the companies hit by the missile-base overruns say they expect reimbursement of their proportionate share of excess costs. So when all is said and done (when the government pays up) base work may not be as great a disaster on profits as it was last year.

Although these companies also felt the pressures of competition for other kinds of work, the immensity of the missile-base burdens overshadowed routine business-getting handicaps.

For more detail on competition and its influence on profits, let's turn to companies involved only slightly or not at all in missile projects.

Warren Bros. Co. Cambridge, Mass., a heavy and highway construction company operating in a wide area of the country, reported: "1960 was a year of competition more intense than that experienced in recent times." And even though 1960 set a record for heavy construction contract awards, "it was more difficult to obtain new contracts," said Warren President B. Howard Henderson. To get the work, Warren had to bid with its profit margin pared to the bone in many cases.

The problem was the same for Foundation Co., New York City (the name describes the company's primary operation). Foundation fell into red ink from a profit position that was precarious in 1959.

Vulcan Materials Co. of Birmingham, Ala. (not included in table), which bought three construction companies in 1959, last year decided to quit construction. Vulcan's construction materials divisions made good profit gains, but the heavy construction division "suffered from low volume and severe price competition," reports Board Chairman Charles W. Ireland.

A consulting engineering company, which can only reflect price conditions in construction, underlined the competitive picture. Lockwood, Kessler & Bartlett, Inc. of Syosett, N. Y.—perhaps the nation's only publicly held company engaged solely in consulting engineering—dropped into the losing column in 1960. President Ford Bartlett said fee revenues declined because of the drop in contract prices.

This company expects a profitable 1961. But to get it they'll have to concentrate on fixed-fee contracts. The widespread practice of basing design fees on a percentage of construction costs is "unrealistic and inequitable," says Mr. Bartlett.

Cost-plus-fixed-fee contracts and entry into land development pushed North American Contracting Corp. of Washington, D. C. into a profit last year. In 1959, it lost money operating only as a general contractor, primarily on a competitive-bid basis.

(*Continued on p. 216*)

Business and Finance Editor ***Bob Stinson*** *read his way through an 18-in.-high stack of annual reports for this first-of-its-kind round-up of financial information.*

Paving contractor's report on 873:

"Helped us get 25% more work in slack time"

Don Broughton, Springfield, Illinois, tells how a compact Barber-Greene 873 Finisher proved a king-sized profit maker by increasing business 25% for P. H. Broughton & Sons:

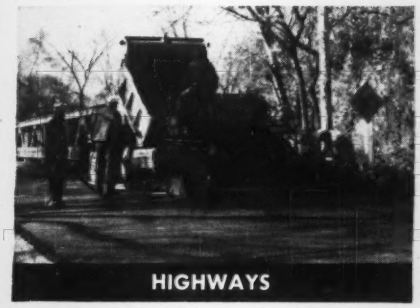
"The bulk of our asphalt paving contracts have always been on state highway jobs. And the slack time—between projects, on week-ends, even hold-ups while projects were in progress—was overhead we had reluctantly lived with as inherent in our business.

"But this amazingly versatile and highly portable Model 873 is the machine that helped us convert slack time into 25% more business—doing all types of paving jobs."

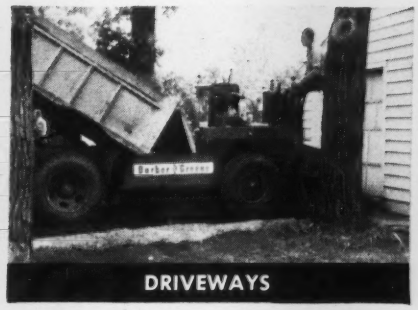
Contractors who have operated with the 873 have found its compact design the economical answer to pave driveways, parking lots, city streets etc. with highway quality surfaces.

These features make the 873 the most profitable compact finisher: paves on crawlers to 50 f.p.m.; travels on pneumatic tires to 30 m.p.h.; basic 8′ paving width variable in 3″ increments from 6-12′; full-width tamping for maximum compaction; 8′ travel width; automatic leveling; simple, positive control with single "joystick" steering lever; hydraulic folding hopper; easy, accurate thickness control; and fast crown adjustment while paving.

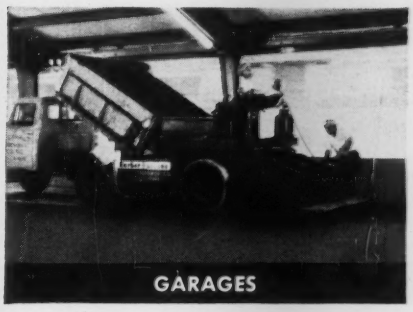
Let your Barber-Greene Distributor show you the 873's profit advantages—whether you are just starting in business or are looking for paving equipment that means extra business in slack time.



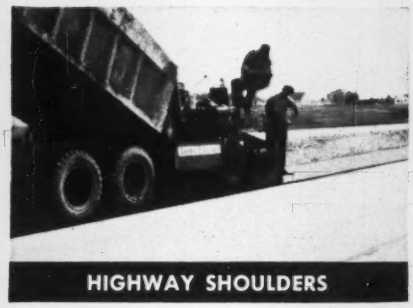
HIGHWAYS



DRIVEWAYS



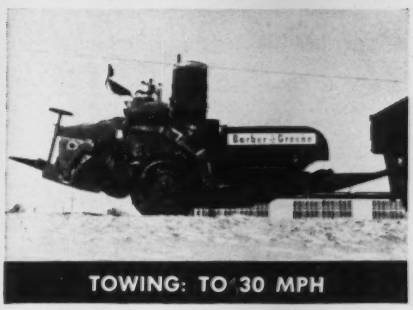
GARAGES



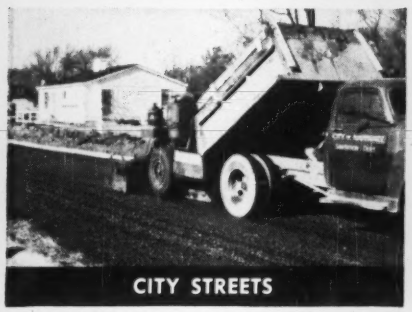
HIGHWAY SHOULDERS

paves on crawlers...
to 50 f.p.m.

travels on rubber
to 30 m.p.h.



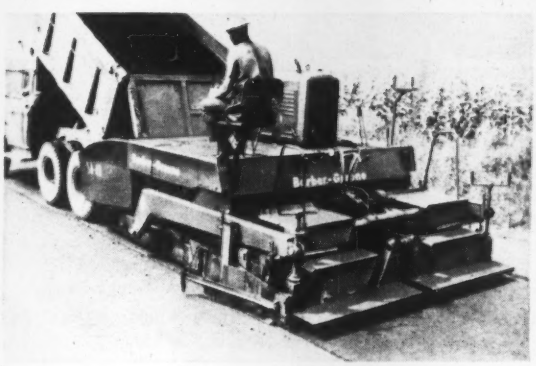
TOWING: TO 30 MPH



CITY STREETS

PLAYGROUNDS

SHOPPING CENTERS



NEW BARBER-GREENE SA-40 FINISHER HEADS NO. 1 FINISHER LINE

The newest star performer in the five-model Barber-Greene Finisher line lets you profit from all the latest advances in finisher design. Your distributor will show you all the exclusive features of this production king, service and maintenance miser, and new symbol of automatic operation and quality paving—the General Duty SA-40.

Whether you pave driveways or super highways or both, there is a Barber-Greene Finisher or Road Widener in a size and production range to deliver maximum economy and profitability for you.

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Representatives in Principal Cities of the World

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Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

F. H. McGraw & Co. of Hartford holds several cost-plus-fixed-fee contracts, and they'll probably help the company show a profit this year. A major cost-plus job is for a $50-million urban renewal project in Hartford. The company is also negotiating (not bidding) for about 11 other jobs.

Merritt-Chapman & Scott Corp. of New York City, primarily in public works, can't count too heavily on any huge volume of cost-plus contracts. But it can and will be more selective, as ordered last year by Chairman Louis E. Wolfson.

In 1960, construction accounted for more than $16 million of the M-C & S's net loss, but in this year's first quarter, the company operated at a profit. And construction contributed to the profit.

Selectivity keynoted the operation of a much smaller company—Electronic & Missile Facilities, Inc. of New York City, which erects buildings at missile bases. Result was a 21% climb in net, in 1960 despite a 26% drop in gross billings.

Utah Construction and Mining, a diversified company, widened its profit margin in 1960, with construction helping. The company does not report construction volume separately, but Chairman Marriner S. Eccles said that although gross construction revenues dropped 9.6% from 1959, construction was "modestly profitable . . . an improvement over the previous year." He added, however, that the rate of return on investment in construction was not satisfactory. He said further improvement this year will depend on getting more work, "particularly in the U. S."

BarChris Construction Co. owes its healthy profit margin to a specialty—bowling alleys. The company provides turnkey service for bowling center construction, delivering to a proprietor a completely equipped bowling center on a site selected by BarChris. The company is opening a new market for its product in Europe. It is building bowling centers in Italy and negotiating contracts in Belgium, France, The Netherlands and Great Britain.

Land development companies generally showed profit margins well above those of contracting concerns. Four such companies—Arvida, All-State Properties, General Builders, and General Development—recorded margins ranging from six to more than 11%. Arvida and General Development, however, followed full-year trends to slimmer profit margins. And, by Jan. 31, 1961, the end of Arvida's fiscal six months, profit turned to loss. The fiscal first half loss increased in the following two months.

The company lost $422,000 in the half after a net profit of $486,000 in the previous fiscal half. (The 1960 profit figure is adjusted to give effect to present accounting treatment. Under the previous method, net for the 1960 fiscal half showed as $261,000.) For the first eight months, ended March 31, preliminary figures indicate a net operating loss of about $529,000. The financial reversal is blamed on "recessionary trends" in the national and Florida economies.

General Development, which owns or controls 186,000 acres in Florida was a trend-bucker in the housing field. In 1960's weak housing year, the company boosted the number of houses built to 1,900, a 94% increase over 1959. This increase, however, was a factor in the drop in the company's profit margin, since the profit on land sales is much greater than that on housing.

Lefcourt Realty Corp. of New York City (not in table), Florida land developer, lost $2.1 million in the nine-month fiscal period ended last January 31. The full fiscal year ended April 30 will show a loss, but not as large as that in nine months. The company reported net profit by $1.7-million in fiscal '60, ended Apr. 30, 1960. The company blames depressed conditions in Florida and Hurricane Donna for the fiscal '61 loss.

The investment builders—those building for their own accounts—generally show sharp fluctuations in earnings from year to year. These companies include Taylor International Corp.; Tishman Realty & Construction Co., Inc.; Kratter Corp., and Uris Buildings Corp. (The last two are not included in the tables.)

Income and profits come from rentals on buildings they own, sale of their buildings, and building-management and operation fees.

Net losses for the most part don't imply the same as losses incurred by contract builders—amortization of mortgage debt and depreciation of properties often exceed income.

(Continued on p. 218)

Business Backlogs

COMPANY	AS OF JAN. '61	AS OF JAN. '60	% CHANGE '60-'61
	(millions of dollars)		
Arundel Corp	$57.9	$45.2	+28
BarChris Construction Corp.	6.1(a)	1.8(a)	+239
Bank Building Corp. of America	33.0		
Catalytic Construction Co.	58.0	32.0	+58
Dravo Corp.	70.5	60.7	+16
Fluor Corp., Ltd.	100.0	54.0	+85
Foundation Co	8.4		
Kaiser Engineers & Kaiser Engineers International	168.1	271.9	−38
Lockwood, Kessler & Bartlett, Inc.	3.3	2.5	+32
Macco Corp.	71.0	49.0	+45
F. H. McGraw & Co.	36.2	13.2	+174
Arthur G. McKee & Co.	70.0	43.0	+63
Merritt-Chapman & Scott Corp.	179.0	239.0	−25
Morrison-Knudsen Co., Inc.	317.0	400.7	−21
Perini Corp.	104.0	159.0	−35
Raymond International, Inc.	139.8	83.9	+67
Thompson-Starrett Co., Inc	8.3	3.2	+159
Utah Construction & Mining Corp.	90.0	108.0	−17
Warren Bros Co	25.1	26.7	− 6
Williams-McWilliams Industries, Inc.	3.9	3.0	+30

(a) As of 2/28 and 2/29, respectively

Equipment Inventory

(At cost—000 omitted)

COMPANY	12/31/60	12/31/59
Arundel Corp.	$11,205	$10,356
Bank Building Corp. of America	579	536
Fluor Corp., Ltd.	7,334	7,780
Great Lakes Dredge & Dock Co	28,927	25,760
Foundation Co	1,604	1,595
F. H. McGraw & Co.	760	1,312
Arthur G. McKee & Co.	495	706
Merritt-Chapman & Scott Corp.	15,931(a)	17,612(a)
Morrison-Knudsen Co., Inc.	46,420	41,382
North American Contracting Corp.	154	not stated
Perini Corp	23,856	not stated
Raymond International, Inc	15,570	13,731
Thompson-Starrett Co., Inc	139	not stated
Utah Construction & Mining Corp.	14,469	15,138
Warren Bros. Co.	23,791	22,420
Williams Bros. Co.	15,342	13,683
Williams-McWilliams Industries, Inc.	7,716	6,863

(a) vessels & floating equipment

"These machines will really do the work!"

Jim and Andy Henderson, owners of Cheboygan Construction Company, Cheboygan, Michigan, employ two new John Deere "1010" Crawler outfits—a loader and 612 All-Hydraulic Bulldozer—and they like them:

"The machines will really do the work," reports Jim Henderson. "A contractor of our size has more use for small crawlers than larger ones. We have to keep down load limits in the spring, and would have problems moving big machines around. The size of these machines lends them to close-quarters work, too. We use the loader and blade to backfill trench around buildings and for work inside. The full hydraulic blade is the answer to good work with small dozers."

Cheboygan Construction Company learned about the new John Deere "1010" through a dealer demonstration. To see for yourself, locate your nearest John Deere earthmoving equipment dealer through the yellow pages of your telephone directory now.

JOHN DEERE

LOADERS
BULLDOZERS
BACKHOES
AND
EARTHMOVING
EQUIPMENT

JOHN DEERE • 3300 RIVER DRIVE • MOLINE • ILLINOIS

Sidelines: Money-Makers Too

Some construction and land development companies get revenues from activities far removed from the field they're best known for. And one that operates solely in construction carries a name that speaks of space and electronic circuitry rather than of construction steel and concrete.

The company in disguise is Electronic & Missile Facilities, Inc., a building contractor based in New York City. The company holds government contracts for Space Agency laboratories, operating buildings and housing at military installations, and hospitals. Last week, the firm established a special division that will go after urban renewal projects.

Baseball is a profitable sideline of Perini Corp. The Milwaukee "Braves" ball club is a separately operated subsidiary. In 1960 the club generated revenues of $5.2 million and contributed gross profits of nearly $570,000 to Perini's gross revenues. Interest, dividends from investments and gains on sale of equipment added another $846,000.

Arvida, land developer and one-third owner of a homebuilding company, obtained $4.1 million in fiscal 1960 revenues from hotel operations. Automobile service stations and rentals also contributed to the income statement.

Thompson-Starrett distributes in the U. S. a line of Japanese-made television, stereophonic and recording units.

Williams-McWilliams Industries has a meat-packing operation serving the New York City area.

Merritt-Chapman & Scott owns 76% of New York Shipbuilding, 96.9% of a paint and industrial finish company, and 99.6% of a chemical and building materials company. One of M-C&S's divisions is Milton Steel, producer of reinforcing steel.

Utah Construction and Mining owns and operates copper, iron, coal and uranium mines and holds a 41¼% equity interest in an international ocean-shipping line.

Stone & Webster is a major underwriter of stock and bond offerings of industry and government, a management consultant, and owner of natural gas producing and distributing companies.

In many cases, sharp fluctuations in earnings from quarter-to-quarter or year-to-year usually reflect sales in the various periods.

Tishman Realty & Construction, one of the larger investment builders, provides a good example of the sharp up and down pattern between quarters. For the first fiscal 1961 quarter ended Dec. 31, 1960, net income after taxes totaled $21,124 against $499,684 in the previous comparable period. But for the fiscal six months ended last March 31, net income after taxes jumped to $819,000 against $792,000 in the 1960 fiscal half.

This company also operates a wholly owned research subsidiary, which has patent applications on a prefabricated concrete parking structure known as Tierpark.

Tishman embarked on a plant-leasing venture two years ago, but terminated the operation. The plan had been to design, build, equip and lease industrial plants. It turned out the company was more involved in equipment than in its specialty—construction.

Taylor International's 1960 earnings were hit by delays in receiving mortgage insurance commitments from the Federal Housing Administration. Outlay of capital for work started, real estate taxes and interest charges, therefore worked for a loss.

At the end of March, the company was constructing buildings valued at $16.5 million. Of the total, all but $365,000 worth were for the company's account. In addition, it held building contracts valued at $7.2 million.

Uris showed a net loss of $136,199 for the fiscal year ended September 30, but before depreciation charges, income was $2.2 million. Because the company was reorganized and its stock offered publicly, 1959 figures are not comparable to 1960's.

The record volume of contracts awarded last year generally helped boost the backlogs of reporting companies. Many companies, although not disclosing actual backlogs, said their volume of uncompleted work at the start of the year topped that of a year ago. And of the 17 companies that compared backlog volume, only six showed declines.

These companies generally indicated the drop in volume came because they're becoming much choosier about which jobs to go after.

Bidding a fair but profitable price cuts the number of contracts won, but in the long run improves the financial health of the company involved and the industry as a whole. This trend will probably be reflected in a higher level of prices for most types of work this year.

Only 17 companies reported the value of equipment on hand at year-end as a separate item, but the machinery holdings of these 17 totaled more than $214 million. This sampling, however, illustrates the vast purchasing power held by the construction industry as a whole.

Morrison-Knudsen alone bought $10.2 million worth of equipment in 1960. Perini Corp. bought $4.9 million worth in the same year. Other companies did not report the amount of machinery acquired in 1960.

Overseas Contractors Join Fight Against Tax Changes

Contractors who work overseas will fight the threat posed to their foreign operations by the Kennedy Administration's proposal to eliminate tax deferral on earnings abroad.

Some of the nation's largest companies last week organized the Construction Industry International Committee. First job will be drafting testimony to present before the House Ways and Means Committee on June 7.

Prime mover in formation of the committee was Raymond International Inc. of New York City. The company's treasurer, Winfred C. Bloom, will select the data and prepare the testimony to be presented by Henry Boschen, president.

Officials of more than a score of companies attended the organization session, and several more firms from all parts of the nation promised their support.

The tax deferral provision has been one of the few aids given overseas contractors by the U. S. government. Stiffening competition for new work outside the country put the financial squeeze on many domestic companies bidding for work abroad, Mr. Bloom says.

The risks and large size of foreign projects require large sums of working capital. Loss of the tax deferral privilege would strike hard at these companies' financial base.

They will also argue that what hurts overseas contractors hurts U. S. equipment makers, and about 10,000 U. S. citizens whose jobs are related to overseas construction.

If forced to turn to only domestic business, the overseas contractors will complicate an already tight competitive construction market in the U. S., Mr. Bloom says. On the other hand, jobs abroad create jobs for U. S. citizens, he says.

A Strong JAB at Labor Peace?

- **JAB stands for Joint Appeals Board, which was set up by AGC and seven unions to reduce strikes.**
- **It will hear and decide all but jurisdictional disputes. But its effectiveness depends on local cooperation.**

The construction industry's new Joint Appeals Board for settling labor disputes without strikes or lockouts or lawsuits may be able to accomplish a great deal without actually doing much work itself.

"I hope we don't have to use it," an industry official commented last week. If you can reach agreement on the facts in a dispute and make full use of local settlement machinery—and those are things the board procedure encourages—you have taken a big step, he explained, toward peacefully settling the dispute yourself at the local level.

The Associated General Contractors of America and seven international unions created the board. These unions are the ones whose members AGC contractors normally employ.

The board is both the heart and the nerve center of a voluntary plan to reduce work stoppages in the industry. The plan emerged as a procedural agreement between the AGC and the seven unions after many months of negotiation.

Under the plan, a local contractor or local union can send labor disputes to the board for final and binding decision.

Collective bargaining disputes over wages, working conditions and other contract terms are within the board's jurisdiction. So are disputes over the interpretation of existing labor contracts. The only disputes that cannot be sent to the board are jurisdictional disputes over work assignments. Those are still governed by the National Joint Board procedure.

Any contractor, whether an AGC member or not, can use the new plan if he uses members of any of the seven participating unions—bricklayers, carpenters, operating engineers, laborers, iron workers, plasterers and teamsters.

Those who wish to use the board must clear several hurdles first:

• A dispute cannot be sent to the board unless both parties to the dispute have agreed to use the plan. This can be done by putting an appropriate clause in a labor contract, by a stipulation or by some other contractual arrangement. (A contractor stipulation also automatically becomes a stipulation for using the National Joint Board. This is not the case with the unions—the teamsters do not participate in that procedure and the other unions come under the National Joint Board plan as members of the AFL-CIO Building and Construction Trades Department.)

• Both parties to the dispute must agree to use the Joint Appeals Board before engaging in a strike or lockout, or before resorting to federal or state labor boards or courts. The board normally has 14 days to decide a dispute.

• The party that submits the dispute must show that the dispute is not governed by other existing procedures that provide for final and binding settlement without strikes or lockouts. And he must show that other available settlement procedures, including collective bargaining, have been fully exhausted.

Contractor requests for a board decision must be channeled through the AGC. Union requests must be routed through the appropriate international union.

Because the plan is voluntary and has no enforcement machinery, it depends almost entirely on support at the local level for its success. It is similar in this respect to the "Ten Commandments" work practices code and to the National Joint Board plan. By the same token, it differs in this respect from the National Constructors' National Disputes Plan, which was a contractual arrangement from the start.

The AGC and the seven unions have agreed to urge their members and affiliates—and AGC subcontractors who work with the basic trades—to use the Joint Appeals Board procedure as a substitute for strikes, lockouts and litigation.

The board will hold its first meeting May 24. Seven contractor and seven international union representatives make up the board. Meetings will normally be held in Washington, but the details—including possible panel operation—must still be worked out.

Harvard Professor John T. Dunlop, who heads the Construction Industry Joint Conference, is the board's nonvoting chairman.

Joint Board Does 'Good Job'

The construction industry's voluntary machinery for the settlement of jurisdictional disputes is about as good as any the industry could devise. That's the general conclusion of a report completed last month by Washington State University's Bureau of Economic and Business Research.

Kenneth T. Strand, who prepared the report, said the National Joint Board for the Settlement of Jurisdictional Disputes affords an effective method for resolving jurisdictional disputes. The board's accomplishments, he noted, "have been outstanding."

One of the reasons for the report's endorsement of the Joint Board procedure is that the machinery keeps the disputes and their settlement within the family. "The only valid private jurisdictional awards are those that stem from procedures wherein all interested parties have a voice," the study pointed out.

The big flaw in the Joint Board is its lack of power to enforce awards and to stop jurisdictional strikes, Mr. Strand said. This has now been overcome, he indicated, by the recent U. S. Supreme Court decision that compels the National Labor Relations Board to decide a dispute on its merits whenever the Joint Board fails to stop a strike.

Had this decision not been handed down, Mr. Strand said, it would have been necessary to amend the Taft-Hartley Act in order to make the Joint Board truly effective.

Before the Supreme Court decision, a dissatisfied union could ignore a Joint Board award with relative impunity. Now it runs the risk of forcing the actual settlement of unsettled disputes into the hands of a government agency unfamiliar with the intricacies of construction industry work assignments.

Members of the industry hope the Supreme Court decision will strengthen the Joint Board. A concerted effort is now under way to improve the board's operations and to minimize the chances of NLRB intervention.

Will Kennedy End Base Delays?

- **Labor Secretary Goldberg is ready to ask for an Executive Order to end labor disputes.**
- **If the President doesn't act fast, Senate probers may turn to new legislation.**

Labor Secretary Arthur J. Goldberg cleared the decks this week for an Executive Order on labor disputes at missile bases.

Following a round of conferences with private experts, labor, management and government officials, he said he would recommend to President Kennedy "in the very near future" a program of effective executive action to assure "uninterrupted and economical production" in space and missile work.

Although the Secretary refused to disclose what specifics he had in mind, the guesses on Monday were that he would urge the President to do two things: Seek a firm no-strike pledge from labor unions, and set up an arbitration board to settle missile disputes.

The Administration's action comes in the wake of the Senate Investigations Subcommittee hearings on labor abuses in the construction of ICBM facilities (ENR May 4, p. 78). The committee is headed by Sen. John L. McClellan (D., Ark.).

In two weeks of public testimony from Defense officials and missile contractors, the committee heard wide-ranging charges of excessive featherbedding by building trades workers, wildcat strikes and other work stoppages, work slowdown, inflated overtime wages, and prolonged and needless jurisdictional disputes—all of which have been an important factor in delaying missile-base construction and in boosting costs.

The McClellan committee is now considering another round of hearings that would focus on what one staff investigator calls "management's responsibility" for excessive missile-base costs. If the hearings are held, the major construction and mechanical specialty contractors involved in missile-base work would be called to testify.

Meanwhile, Senator McClellan is keeping a close watch on the Administration's bustling attempt to manage the labor issue. He wants to see whether the executive action will be adequate, or whether new legislative restrictions should be clamped on the building trades unions.

Among the proposals Senator McClellan is considering are these:

- A requirement for unions to post a 10-day notice of an intended work stoppage on a missile construction site. Failure to do this would cost the unions their status under federal labor laws.
- Outlawing wildcat strikes on missile bases.
- Strengthening current prohibitions against jurisdictional disputes and secondary boycotts.
- Legalizing federal machinery to settle missile-base labor disputes.

To head off new legislative measures the Administration has come up with its own package of ideas:

- Defense Secretary Robert S. McNamara has ordered the Air Force to play a more direct role in labor matters and to crack down on featherbedding and other "wasteful labor-management construction practices" occurring at ICBM sites.
- Mr. Goldberg has set up a three-man "missile site public contracts advisory committee" headed by Thomas W. Holland, a George Washington University economics professor and a leading labor arbitrator. The committee will recommend criteria for applying the Davis-Bacon prevailing wage law to missile work. The Secretary concedes that use of criteria will "not settle" jurisdictional disputes, but feels that a re-evaluation of what is "construction" work may ease the problem.
- At the President's direction, Mr. Goldberg met separately last week and early this week with various groups to exchange ideas on executive action to free the missile program from labor disputes and unnecessary labor costs. Included in the conferences were Pentagon officials, labor-management experts, AFL-CIO President George Meany, craft and industrial union officials, missile manufacturers, missile-base contractors and Labor Department lawyers and officials.

An Executive Order setting up an arbitration panel along the lines of the old War Labor Board may emerge from the Goldberg study. Effectiveness of such an order would depend, however, on the willingness of the building trades unions to agree to a meaningful no-strike pledge. A no-strike policy statement adopted by the AFL-CIO Building and Construction Trades Department in February has turned out to be virtually useless. Close to 40 work stoppages have occurred on missile sites since its adoption.

A construction industry spokesman in Washington warned that the Administration's proposals "could be a temporary palliative and a whitewash (for the building trades unions) if not handled properly."

Akron Plumbers Take the Fringes

The first break in building trades negotiations in Akron, Ohio, came in the form of a two-year contract that leaves the plumbers' scale at $3.91.

The plumbers won 14 cents an hour each year, but they took all of it in fringe benefits—10 cents for a new vacation fund and four cents for improved health and welfare benefits.

The contract cuts overtime from Monday through 4:30 p. m. Saturday from double time to time-and-a-half. A contractor spokesman said this is a bid for more factory maintenance and repair work. The rollback does not apply to new construction work.

Akron roofers and sheet metal workers agreed to a similar settlement a few days later. They accepted offers of 14-cent wage boosts each year in two-year contracts.

Elsewhere, three-year contracts have been running strong.

Teamsters in Portland, Ore., will get a 33-cent wage increase over the next three years (13, 10, 10) plus a boost in health and welfare benefits from 7½ to 10 cents an hour.

Lathers in Columbus, Ohio, settled for three annual wage boosts of 10 cents each for a total of 30 cents in a three-year pact. Bricklayers and hod carriers in Canton and laborers in Massillon did a little better—40 cents to be spread over three annual installments (10, 15 and 15).

Operating engineers working for members of the Rochester, N. Y. Aggregates & Excavators Association settled for the same amount—40 cents for three years. But Rochester teamsters in six mason supply firms called off a five-day strike for a little less—a total of 24 cents, plus improved health and welfare benefits, over the next three years.

Steelworkers Fall Into Boycott Trap

The U. S. Court of Appeals has given the AFL-CIO building trades unions another victory in their fight with the federation's industrial unions over construction jobs in manufacturing plants.

The case will most likely end up in the Supreme Court. But meanwhile, the Appeals Court has ruled in favor of the crafts in a key decision involving U. S. Steel's Tennessee Coal & Iron Division at Bessemer, Ala. It found the steelworkers guilty of a secondary boycott violation when it barred craft workers of an independent contractor from construction work at T C & I's location at Bessemer.

The court upheld the National Labor Relations Board ruling against steelworkers Local 4203 whose members persuaded employees of the contractor not to perform construction work at the site. The steelworkers local claimed the right to the work on the grounds that it held a collective bargaining agreement with T C & I and had a prior claim to the work.

The dispute occurred in 1958 when the company began construction of a multimillion-dollar sintering plant—on the same tract but half a mile away from the main plant. It gave the work to an independent contractor. When craft employees began work on the project they were met by steelworkers members who persuaded them to leave the job.

The NLRB held this was a Taft-Hartley violation by the steelworkers. It said the steelworkers' action was taken against a neutral contractor and not their employer—T C & I. This, said the Board, was a secondary boycott. The Board's opinion was backed in the subsequent appeal before the U. S. Court of Appeals by the AFL-CIO Building and Construction Trades Department.

This court test has been at the center of the feud between the AFL-CIO's craft and industrial unions and actually was the main factor in their recent split over situs picketing legislation before Congress. In their argument in court against the steelworkers, the building trades cited the "Denver" case as the grounds for charging the industrial unions with an unfair labor practice.

It is the Denver case that the building trades have been seeking to overturn in the legislation to permit picketing of a multi-employer construction site.

When the building trades used the Denver argument against the steelworkers, the industrial union refused to support their picketing legislation on the grounds that the Denver ruling could still be used against them, while the crafts would get out from under the ruling if the legislation was approved.

The Appeals Court did not mention the Denver case specifically, in its decision. The opinion for the three-man court, written by Justice Elijah B. Prettyman, said, "We think the interest which the employees (the steelworkers) had . . . did not justify the action they took . . . The purpose of the shut-down of the construction work was plainly to force the company to assign this work to these union members. Nevertheless, the efforts at work-stoppage were directed solely against the contractors."

In their arguments before the Court of Appeals, both the building trades and industrial union attorneys cited this as a key case in their rivalry. Said the building trades: "The determination of the issues . . . in this case will have a substantial bearing on the rights of approximately three million building and construction tradesmen . . ."

The industrial unions countered: "If they (the building trades) can obtain a decision that any strike against the contracting out of bargaining unit work is an unfair labor practice, then industrial workers will be left entirely defenseless and industrial employers will be entirely free to contract out work without the inconvenience of bargaining with the representatives of their own employees."

Hot-Cargo Clauses May Be Hard to Get

The Landrum-Griffin law legalized hot-cargo clauses in construction industry labor contracts. But the law does not sanction strikes to enforce such clauses—or to get them in the first place.

A National Labor Relations Board trial examiner has just reaffirmed these conclusions. He said picketing for the purpose of getting a subcontractor clause is still illegal.

He was faced with this situation, which sheds some light on the situs picketing bill controversy:

An uncertified local of the operating engineers union picketed a Wichita, Kan., contractor whose workers the union did not represent. The contractor had a nonunion contractor on one job that was picketed. The union was trying to force the general contractor to accept a master labor agreement. It picketed for several months and never did request a certification election.

The master agreement the union was pushing contained a subcontractor clause. The clause would have imposed the master contract on all subcontractors. Workers of another employer honored the pickets and quit work.

The examiner ruled that the union had no right to picket to get the subcontractor clause. He also declared the picketing illegal on other grounds: It violated the organizational picketing provisions of the law, he said, and resulted in an illegal secondary boycott to force the unionization of the subcontractor.

The situs picketing bill, if law, would have prevented the examiner from pinning the boycott label on the picketing.

Commenting on the subcontractor clause, the examiner said: "Although the Act permits such clauses in collective bargaining agreements related to the construction industry, it is clear that picketing to enforce such agreements is not permitted. Since this is true with respect to agreements that have been entered into lawfully, it must follow that picketing to force an employer to enter into such an agreement is forbidden even in the construction industry."

If the general contractor had signed the master agreement, the examiner said, he would have been forced to fire the nonunion subcontractor—or the sub would have had to knuckle under to the union regardless of the wishes of its employees. Picketing designed to achieve such ends, he noted, is a boycott banned by present law.

The union was in no position, according to the examiner, to argue that it was merely engaged in lawful organizational picketing. To do so, it would have had to do something it failed to do—and that is seek a certification election within 30 days.

The union, however, tried to save the day by claiming that the picketing was legal because it was simply intended to publicize the fact that the general contractor had no contract with it. The examiner knocked this argument down—because the publicity proviso does not apply where the picketing causes a secondary boycott, as it did here.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.70 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.
SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: May 25, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y., Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal-Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 25th day of May 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. Fuller, District Engineer, 353 Broadway, Albany 1, New York						
Essex Rtes. 22 & 73	FARC 61-57	Ticonderoga-Montcalm Landing, S.H. 8073; Ticonderoga Vill. Pt. 2, FASH 50-7; Ticonderoga-Crown Point Pt. 1, S.H. 891 Schroon Lake-Ticonderoga, Pt. 2, S.H. 8230 Proj. F-371(5)	3.44	Asphalt Concrete 2 Span Comp. Plate Girder Bridge 214.3' Tot.	$80,000 Plans $5	$1,430,000
Essex Rtes. 9 & 22	DA 61-2	Defense Access Improvements on Rte. 9, S.H. 8314, 8238, 232, 859; Rte. 22, S.H. 8128, 1641, 1687, 8238 Proj. RAD 13(5)	25.5	Tree Trimming	$1,000 Plans $5	19,000
Greene Rte. 23	R.C. 61-74	Ashland-Windham, S.H. 8051	4.15	Asphalt Concrete	$8,000 Plans $5	148,000
Essex	DA 61-4	Reber Road—Defense Access Proj. RAD 13(3)	0.46	Asphalt Concrete=0.44 Mi. Misc. Work=0.02 Mi	$3,500 Plans $5	63,000
DISTRICT No. 2, L. Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Oneida Rte 13, 49 & 69	FARC 61-36	Cleveland-Vienna, Pt. 4, S.H. 8103; South Bay-Vienna, Pt. 1 & 2, S.H. 8219; Vienna-Camden, Pt. 1 & 2, S.H. 8186; Camden-Taberg, Pt. 1, S.H. 5461 Proj. F-384(6); F-635(7)	9.32	Asphalt Concrete, Type 2A	$87,000 Plans $5	1,580,000
DISTRICT No. 3, E. E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Oswego	M.A. 61-1	Maintenance Area for Interstate Route (505) at Maple View	....	Grading, Drainage & Paving	$9,000 Plans $5	155,000
Seneca Rte. 96A	FARC 61-54	Reservation Rd.-Ovid, Sh 323 Ovid-Romulus, S.H. 5282 Proj. F-626(6)	4.59	Asphalt Concrete Type 1A	$50,000 Plans $5	912,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe (Rte. 47 & Int. Tr. Rte. 490)	FITS 61-12 FATS 61-13	Interstate Rte. Conn. 580 (Fish 56-9 & FISH 58-16) Rochester-Bushnell Basin, Pts. 2 & 3; Rochester Outer Loop (FASH 58-17, FAC 59-8, FASH 59-14 East Ave. to Winton Road) Winton Road-Sea Breeze Pt. 2, (FASH 56-7). Proj. I-490-2(24); U-1097(7)	4.75	Traffic Signs and Delineators	$6,000 Plans $5	109,000
Monroe	FATC 61-2	Rochester City: Inner Loop (FAC 60-7) (Front Street to North Street) Proj. U-1089(14)	0.28	Traffic Signals	$2,800 Plans $5	50,000
Monroe	LOSPTS 61-2 FATS 61-15	Lake Ontario State Parkway (Dewey Ave.-Rochester City Line); Rochester City: Lake Ontario State Parkway Art. Hwy. (Rochester City Line-Lake Ave.) Proj. U-1141(4)	1.68 (0.93 Acc.)	Traffic Signs & Delineators	$2,100 Plans $5	39,000
Monroe Rte. 104	FARC 61-79	Rochester-Webster, Pt. 1, S.H. 98 Rochester-Webster, Pt. 2, S.H. 99 Proj. U-362(13)	1.15	Asphalt Conc=1.04 Mi.; Misc. Work=0.11 Mi. Incl. Bridge Comp. WF Beam 1 Span—74.5' Total	$35,000 Plans $5	633,000
Monroe (Int. Trg. Rte. 490) MDC	FISH 61-14	Interstate Rte. Conn. 580 Rochester Western Expressway (Union St. to West Side Drive) Proj. I-IG 490-2(23)	3.70 (1.26 Acc.)	9" Cem. Conc. Pavt., 2 @ 24' Var.=3.61 Mi., Access=0.76 Mi. Cem. Conc. Pavt. & 0.50 Mi. Asph. Conc. Type 1A. Misc. Work=0.09 Mi.; 2 RRGS Comp. I-Beam, Ea. 3 Sp., 192' Tot. 4 H.C.S. Comp. I-Beam 2-Ea. 3 Sp., 188' Tot.; 2-Ea. 3 Sp., 128' Tot.	$185,000 Plans $5	3,388,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Chautauqua (Rte. 39)	R.C. 61-75	Sheridan-Forestville, Pt. 1, S.H. 8358	4.84	Asphalt Concrete	$20,000 Plans $5	365,000
Erie Niagara (Rte. 78)	FARC 61-64	Transit, Pt. 2, S.H. 89; Transit Rd. Pt. 3, S.H. 507; Transit Pt. 3, S.H. 507 Proj. F-651(10)	0.65 (0.16 Acc.)	Asph. Conc.=0.50 Mi.; Misc. Work=0.31 Mi. Comp. I-Beam Br. 2 Sps., 157' Tot.	$36,000 Plans $5	663,000
DISTRICT No. 6, Wm. J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Chemung (Rte. 427)	FARC 61-70	Penn State Line-Wellsburg, S.H. 1710; Wellsburg-Waverly, Pt. 1, S.H. 1764 Proj. S-697(4)	1.31	Asphalt Concrete	$50,000 Plans $5	884,000
Steuben (Rte. 17)	FARC 61-80	Jasper-Addison, S.H. 5253 Proj. F-442(8)	3.97	Asphalt Concrete	$17,000 Plans $5	300,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clinton (Rte. 22B)	FARC 61-71	Plattsburg-Cadyville, Pt. 1, S.H. 777; Morrisonville-Schuyler Falls, S.H. 1567; Peru-Schuyler Falls, S.H. 1705. Proj. S-548(2)	6.30	Asphalt Conc. Type 1A=6.26 Mi., Misc. Work=0.04 Mi., Comp. I-Beam Br., 3 Sps. 199.38' Tot.	$62,000 Plans $5	1,132,000
Clinton (Rte. 22)	R.C. 61-78	Mooers-Hemmingford, S.H. 8174	3.42	Asphalt Conc. Type 1A	$12,000 Plans $5	206,000
Franklin (Rte. 3)	R.C. 61-77	Piercefield-Tupper Lake, Pt. 2, S.H. 8109	2.13	Asphalt Conc. Type 1A	$5,500 Plans $5	98,000
St. Lawrence, Franklin (Rte. 37) MDC	T.S. 61-14	Massena-Helena, Pt. 1, S.H. 1261; Raquette River-Hogansburg, Pt. 1, S.H. 1861; Raquette River-Hogansburg Pt. 2; St. Regis Indian Reservation-Fort Covington, Pt. 1, S.H. 8396	5.40	Traffic Signs and Delineators	$2,500 Plans $5	47,000

(Continued on the following page)

(Continued from preceding page)

DISTRICT No. 9, J. C. FEDERICK, District Engineer, 71 Frederick Street, Binghamton, New York

Broome (Int Trg. Rte. 81)	FISH 61-11 FIC 61-9	Interstate Rte. 505 Five Mile Point to Broad Ave. (Five Mile Point-Binghamton State Hospital) Proj. EI-81-1(12)	3.01 (5.08 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' Var.=2.51 Mi; Asph Conc. Ty. 2A=0.14 Mi.; Misc. Work=0.36 Mi.; Access=3.67 Mi. Cem. Conc. Pavt: 0.05 Mi. Cem. Conc. Pavt with Carb. Black; 1.21 Mi. Asph Conc; 0.15 Mi. Asph. Conc. Type 2A; 7 Hgs Comp. I-Beam, 6 Sps. 310.75' Tot., 4 Sps. 240.2' Tot., 4 Sps. 225.2' Tot., 3 Sps. 158.25' Tot., 3 Sps. 152.5' Tot., 4 Sps. 335' Tot., 4 Sps. 344' Tot.; 1 Br. Comp. I-Beam, 1 Sp @ 42.6'; 2 Hgs Welded Plate Girder; 1 Sp @ 136.4'; 3 Sps 308' Tot.; 5 Brs. Reinf. Conc. Twin Closed Box 41.33' Tot; 41.33' Tot; 41.33' Tot.; 25.5' Tot; 25' Tot.	$400,000 Plans $10	7,414,000

DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York

Kings (Int. Trg. Rte. 278)	FIGE 61-1	Interstate Rte. Conn. 512 Gowanus Expressway-Cont. 3 (2nd Ave. to 20th St. Incl. Prospect Expressway Interchange) Proj. EI-278-1(60)	0.66 (0.31 Acc.)	Main Line: Reinf. Conc. Slab. Roadway (Struct)= 0.30 Mi. Grade, Drain. & Misc. Work=0.36 Mi., Surf Sts. Grade. Drain. Misc. Work=0.31 Mi. Incl. Elev. Structure & Prospect Exp. Inter.	$375,000 Plans $10	6,819,000
Kings	FAPE 61-2	Prospect Expressway (Fifth Avenue to Greenwood Ave.). Proj. U-1081(5)	1.20	Roadside Development	$6,000 Plans $5	115,000
Kings	FAPETS 61-1	Prospect Expressway: Fort Hamilton Parkway Interchange (Greenwood Ave. to Beverly Rd.-FAPE 59-1) Proj. U-1081(6)	0.54	Traffic Signs	$2,500 Plans $5	42,000
Nassau	FAWOBETS 61-2	Wantagh-Oyster Bay Expressway (Contract 1A) (Old Country Road, C.R. 4 to Jericho Turnpike-Plainview Rd. S.H. 436). Proj. U-1110(4)	3.34	Traffic Signs	$9,000 Plans $5	160,000
Nassau (Rtes. 25, 106, 107)	FATS 61-11	Massapequa-Glen Cove, S.H. 9017; Jericho-Oyster Bay, S.H. 9021; Jericho Turnpike, S.H. 9020; Jericho Turnpike-Plainview Rd. S.H. 436 Proj. US-377(7), US-500(5), U-1000(11)	3.08	Traffic Signs and Delineators	$7,000 Plans $5	130,000
Queens	FAGCP 61-1	Grand Central Parkway: Section 3 (150th St. to 166th Street). Proj. U-629(10)	0.53	Relocation of Utilities (Municipal)	$21,000 Plans $5	398,000
Suffolk	SSP 61-2	Southern State Parkway (New Highway to Captree State Parkway)	6.30	Landscaping	$25,000 Plans $5	452,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y. and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: May 19, 1961

West Virginia Turnpike Commission

ADVERTISEMENT FOR PROPOSALS

Sealed proposals will be received by the West Virginia Turnpike Commission for:

CONTRACT NO. M-14

The work to be done under Contract No. M-14 consists of furnishing all labor, materials and equipment for cleaning and repainting all exposed surfaces of steelwork on the Yeager Bridge over the Kanawha River near Mile 86 in Kanawha County, West Virginia, which bridge forms a part of the West Virginia Turnpike.

The approximate tonnage of steelwork to be repainted is 3,360 tons.

Proposals will be received at the office of the West Virginia Turnpike Commission, Administration Building, Port Amherst, West Virginia, until 2:00 P.M., Eastern Standard Time, on May 19, 1961, at which time and place said proposals will be publicly opened and read.

Contract documents may be inspected by prospective bidders during office hours at the office of the Commission, and will be furnished for Five Dollars ($5.00) per set, not refundable, upon application to the Commission at the above address. Checks shall be made payable to the West Virginia Turnpike Commission.

Inspection of the steelwork on and above the surface of the bridge roadway will be permitted only on May 11 and 12, 1961, and then only after prior arrangements have been made with the General Manager of the Turnpike.

Proposals must be made upon the proposal forms furnished by the Commission in the manner designated in the specifications, and must be enclosed in sealed special address envelopes bearing the name and address of the bidder and the number of the contract on the outside, and must be accompanied by a CASHIER'S or CERTIFIED CHECK or PROPOSAL BOND in favor of the West Virginia Turnpike Commission FOR AN AMOUNT EQUAL TO FIVE (5) PER CENT OF THE AMOUNT OF THE PROPOSAL, but not less than $500.00 nor more than $200,000.00 and must be delivered at the place designated above on or before the day and hour named. Copies of the proposal form and proposal bond form to be used for submitting proposals, and of the special addressed envelope are furnished in detached form with the contract documents.

The Contract will be awarded or proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all proposals, and to waive any or all formalities.

WEST VIRGINIA
TURNPIKE COMMISSION
W. C. Stathers
Chairman

Bids: May 19, 1961

Delaware Interstate Highway Division

CONTRACT NO. 45
DELAWARE MEMORIAL BRIDGE
ACCESS ROAD TO MEMORIAL PLAZA
NOTICE TO BIDDERS

Sealed proposals for the construction of an access road to the existing memorial plaza just south of the Delaware Memorial Bridge Toll Plaza near Wilmington, Delaware, will be received by the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge, until 11:00 A.M., Eastern Daylight Saving Time, on May 19, 1961, at which time and place said proposals will be opened and read.

The work to be performed under this Contract includes, but is not necessarily limited to: excavation; embankment construction; pavement, sidewalk, curb and gutter construction; new drainage facilities; topsoiling and seeding; and other incidental work.

Work on this project shall begin within ten (10) days after the execution of the Contract and shall be completed on or before October 20, 1961.

Monthly payments will be made for ninety (90) per cent of the work completed each month.

Bidders must submit proposals upon forms provided by the Division.

Each proposal must be accompanied by an acceptable surety bond, certified check or cash in the amount of at least ten (10) per cent of the total amount of the proposal.

The Contract will be awarded or proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all bids.

One set of the contract documents may be obtained from the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge near Wilmington, Delaware, after May 8, 1961, upon payment of $10.00. Contract documents need not be returned and the above payment will not be refunded. Checks shall be made payable to Howard, Needles, Tammen & Bergendoff.

Delaware Interstate Highway Division
By: J. H. Tyler McConnell, Director
William J. Miller, Jr., Acting Chief Engineer
Delaware Interstate Highway Division
May 4, 1961

District of Columbia—Highway Construction—Dept. of Highways & Traffic, D. C., May 1, 1961. SOUTHEAST FREEWAY CAPITOL SUBSTATION, FEDERAL AID INTERSTATE PROJECT NO. I-695-3(5)2, Invitation No. C-6146-H, consisting of 960 cu. yds. Concrete Masonry and 187,000 lbs. Structural Steel (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $20.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EDT, June 6, 1961, in Room 424, 499 Penn. Ave., N.W.

Bids: June 13, 1961

City of Norwalk Connecticut

ADVERTISEMENT

Sealed proposals for construction of a Refuse Incinerating Plant will be received by the Mayor and Common Council in the City Hall, South Norwalk, Connecticut, until 8:00 P.M. Eastern Daylight Saving Time on June 13, 1961, after which time they will be publicly opened and read aloud. No bids will be accepted after said hour. Proposals will be received on the following contracts:

General Construction	— Contract 3G
Incinerator and Appurtenances	— Contract 3I
Chimney	— Contract 3C
Caisson Well	— Contract 3W
Plumbing, Heating & Ventilating Work	— Contract 3P
Electrical Work	— Contract 3E

Information for Bidders, Proposal forms, Specimen Contract, Plans, Specifications and copies or specimens of all pertinent documents may be examined at the offices of Bowe, Albertson & Associates, Engineers, 75 West Street, New York, New York and at the office of the City Clerk, Room #4, City Hall, South Norwalk, Connecticut, between the hours of 10:00 A.M. and 4:00 P.M. daily except Saturdays, Sundays and holidays.

Copies of plans and specifications may be obtained at the office of the City Clerk and at the offices of the Engineers, upon making a deposit of Twenty-five ($25.00) dollars, which will be refunded to bidders only who apply for a refund within thirty (30) days after the date proposals are opened and who return the plans in good condition.

Extra copies of plans and specifications may be obtained at a cost of Twenty ($20.00) dollars per set, which will not be refunded. Extra sheets of plans may be obtained at a cost of One ($1.00) dollar each, which will not be refunded.

A bid bond for 10% of the amount bid must be deposited by the bidder with his bid as a guarantee that, in case a contract is awarded to him, he will execute such contract and furnish a satisfactory Performance and Labor and Material Bond. Acceptance of the bid will be contingent upon fulfillment of this requirement by the bidder and on failure to do so, he shall forfeit the deposit.

The Mayor and Common Council of the City of Norwalk reserves the right to reject any or all bids, to waive any informalities or to accept the bid or bids which in its judgment will be for the best interests of the City of Norwalk.

CITY OF NORWALK
CONNECTICUT
By John Shostak
Mayor

BOWE, ALBERTSON & ASSOCIATES
Engineers

Bids: May 23, 1961

Clearing and Grubbing Cannonsville Reservoir

CONTRACT 479

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Daylight Saving Time, on Tuesday, May 23, 1961, for Contract 479, for clearing and grubbing the westerly portion of the Cannonsville Reservoir and performing related work, in the Towns of Deposit and Tompkins, Delaware County, New York. The work will comprise the clearing of approximately 1860 acres, the grubbing of about 400 acres, required excavation and removal of excrementitious material, all as set forth in the specifications.

Pamphlets of the contract can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $10.00 for each pamphlet. There will be a charge of $1.00 to cover mailing costs for each set of contract pamphlets requested. For further particulars, apply at the office of the Chief Engineer at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

Read the Official Proposal Column of
ENGINEERING NEWS-RECORD
This Week and Every Week

Bids: May 29, 1961

County of Monmouth State of New Jersey

INVITATION TO BID

Notice is hereby given that sealed bids will be received by the Board of Chosen Freeholders of the County of Monmouth for reconstruction of the following bridges and approach roads: (a) Phalanx Road and Bridge A-38; (b) Laird Road and Bridge A-42; (c) Muhlenbrink Road and Bridge A-40; and (d) Long Bridge Road, Bridge A-54 and Culvert H-32; and opened and read in public in the Hall of Records, Main Street, Freehold, New Jersey, on Monday, May 29th, 1961 at 2:00 p.m. Eastern Daylight Saving Time.

Plans, specifications and form of bid, contract and bond for the proposed work, prepared by American Water Works Service Company, Inc.; and H. Leroy Martin, Monmouth County Engineer, have been filed in the Hall of Records, Main Street, Freehold, New Jersey and may be inspected by prospective bidders during business hours. Bidders will be furnished with a copy of the plans and specifications by the Engineer upon proper notice and payment of a fee of Twenty Five Dollars ($25.00) payable to the Treasurer of the County of Monmouth.

Bids must be made on standard proposal forms in the manner designated therein and required by the Specifications; must be enclosed in sealed envelopes bearing the name and address of the bidder and the name of work on the outside, addressed to the Board of Chosen Freeholders of the County of Monmouth and must be accompanied by a bonding certificate and a certified check, drawn to the order of the Monmouth County Treasurer, for not less than Ten Per Cent (10%) of the amount bid and be delivered at the place and on the hour above named. The standard proposal forms will be furnished upon application to the Monmouth County Engineer.

The right is reserved to reject any or all bids if deemed to the interest of the County of Monmouth to do so.

By order of the Board of Chosen Freeholders of the County of Monmouth.

Joseph C. Irwin, Director
Irving S. Bennett, Clerk

Bids: June 20, 1961

Philadelphia, Penna. Procurement Department Water Department

Sealed bids will be received in Room 313, City Hall Annex, until 2.30 P.M., Daylight Saving Time, on Tuesday, June 20, 1961, and opened at that time for:

BID NO. 2770—WORK NO. W-1101—General Construction for the Belmont Filter Plant Rehabilitation Project, including Piping, Pre-treatment Structures and Equipment, Chemical Building Structures and Equipment, Structures for Additional Filters, Rehabilitation of Existing Filter and Administration Buildings, Conversion of Two Slow Sand Filters to a Filtered Water Reservoir, and Allied Work.

BID NO. 2771—WORK NO. W-1102—Filter Equipment, Piping and Automatic Controls for the Belmont Filter Plant Rehabilitation Project, including Wash Water Pumping Equipment.

BID NO. 2772—WORK NO. W-1103—Electrical System for Belmont Filter Plant Rehabilitation Project.

BID NO. 2773—WORK NO. W-1104—Heating and Ventilating System for the Belmont Filter Plant Rehabilitation Project.

BID NO. 2774—WORK NO. W-1105—Plumbing System for the Belmont Filter Plant Rehabilitation Project.

BID NO. 2775—WORK NO. W-1106—Elevated Steel Wash Water Tank of 150,000 Gallons Capacity, including Structural Steel Supporting Structure, Piping and Appurtenances, for the Belmont Filter Plant Rehabilitation Project.

Proposal forms, questionnaires and specifications may be obtained from the Water Department, in Room 1132, City Hall Annex, Juniper Street and Filbert Street, Philadelphia 7, Penna.

Upon payment of Deposit of $100.00 for Bid No. 2770, $20.00 for Bid No. 2771, $20.00 for Bid No. 2772, $25.00 for Bid No. 2773, $20.00 for Bid No. 2774, $5.00 for Bid No. 2775 or $150.00 for Complete Set covering all Six Bids. Blueprints may be obtained in Room 1132, City Hall Annex. The deposits will be refunded upon return

of the Blueprints, unmarked and in an undamaged condition, within ten (10) days after bids are received.

No bids will be received unless bidder is qualified by the Procurement Commissioner. The questionnaire form with all questions fully answered must be filed with the Water Commissioner, Room 1113, City Hall Annex, at least one (1) week prior to the date of opening bids.

Each proposal must be accompanied by security in form and amount as set forth in the proposal form.

Bids: June 22, 1961

The Port of New York Authority

GEORGE WASHINGTON BRIDGE
LOWER LEVEL EXPANSION
NEW YORK APPROACH
LANDSCAPING

CONTRACT GWB-190.015

Pursuant to the provisions of the Highway Law and special provisions for projects financed with Federal Aid Funds, sealed proposals for the sale of materials and performance of Work for the landscaping of the New York Approach to the George Washington Bridge will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Thursday, June 22, 1961, at which time said proposals will be opened and read in Room No. 1108.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, May 18, 1961

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5585) will be received at Huron, South Dakota, until 10 a.m., Central Standard Time, June 8, 1961, for furnishing labor and materials for Spencer, Denison and Creston Substations, Stage 01, Transmission Division, Iowa, Missouri River Basin Project. Location near Spencer, Denison and Creston, Iowa. Principal items are 71,700 cu. yds. excavation; 1,255 cu. yds. concrete; lump sum—constructing three service buildings; 446,000 pounds, furnishing and erecting steel structures; 53 transformers, installing transformers; and other work. Completion time 410 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 825, Huron, South Dakota; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

Sealed bids for alterations, 7th Floor for food and drug administration laboratory, at the U. S. Military Medical Supply Depot, Brooklyn, N. Y., Project No. 00934, will be received until 2:00 P.M., E.D.S.T., June 9, 1961, and then publicly opened. Bidding material may be obtained from the Business Service Center, General Services Administration, 250 Hudson Street, New York 13, N. Y.

Contractors Watch This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

Bids: June 7, 1961

Tyrone Borough Sewer Authority Tyrone, Pennsylvania

ADVERTISEMENT FOR BIDS

Separate sealed proposals for the construction of the Additions to the Sewage Treatment Plant, 30" Transmission Line and Sludge Force Main in and near the Borough of Tyrone, Pennsylvania, will be received by the Tyrone Borough Sewer Authority, in the Borough Hall at Tyrone, Blair County, Pennsylvania, until 10:00 A.M. (D.S.T.), Wednesday, June 7, 1961, and publicly opened and read aloud.

The work will be divided into four contracts designated as follows:

CONTRACT NO. 6—GENERAL WORK
CONTRACT NO. 7—MECHANICAL WORK
CONTRACT NO. 8—ELECTRICAL WORK
CONTRACT NO. 9—30" TRANSMISSION LINE AND SLUDGE FORCE MAIN

Bidders may bid on any one contract, or more than one contract, but a separate proposal accompanied by a separate check or Bid Bond must be submitted for each contract for which a bid is submitted.

Information for Bidders, Form of Proposal, Specifications and Form of Contract, may be examined at the office of Lewis L. Gwin, Consulting Engineers, 1200-12th Avenue, Altoona, Pennsylvania, and copies thereof may be obtained upon a deposit of Fifty ($50.00) Dollars for each set of documents for each contract. If the documents are returned in good condition within five days after the opening of bids, the full amount of the deposit for one set will be returned to each actual bidder and other deposits will be refunded with a deduction of $25.00 to defray the actual cost of reproduction. If the documents are not returned within the time stated, the entire amount of the deposit will be forfeited.

A certified check or bid bond drawn to the order of the "Tyrone Borough Sewer Authority" equal to Ten (10) percent of the amount of the bid must be submitted with the proposal.

The proposal must be sealed and marked "SEALED PROPOSAL FOR CONTRACT NO. , FOR THE CONSTRUCTION OF ADDITIONS TO THE TYRONE BOROUGH SEWAGE TREATMENT PLANT", addressed to Mr. Charles C. Burley, Secretary of the Tyrone Borough Sewer Authority, and the contract or contracts under which the proposal is being submitted must also be shown thereon.

The Tyrone Borough Sewer Authority reserves the right to reject any or all bids or waive any informality, and to award each contract to cover the construction of the additions to the Tyrone Sewage Disposal Plant, as may be deemed by the Tyrone Borough Sewer Authority to be to their best interests.

No bidder may withdraw his bids within sixty (60) days after the actual date of the opening thereof.

Date May 4, 1961

CHARLES C. BURLEY, SECRETARY
TYRONE BOROUGH
SEWER AUTHORITY
P. O. BOX 28, TYRONE, PENNA.

Bids: June 5, 1961

The Easton Utilities Commission

ADVERTISEMENT FOR BIDS

Sealed Proposals will be received by The Easton Utilities Commission of Easton at their Office in Easton, Maryland until 8:00 P. M., E.D.S.T. Monday, June 5, 1961 for construction and installation of a fifty (50) acre Primary and a thirteen (13) acre Secondary Waste Stabilization Lagoon, together with all necessary appurtenances, fixtures, and fittings for completing improvements to The Municipal Sewerage System in the Town of Easton, Maryland.

Form of Contract, Specifications and Plans, and Blank Proposals may be obtained from the Secretary-Treasurer of The Easton Utilities Commission upon Deposit of fifty dollars ($50.00).

A certified check, cash or a Bid Bond in an amount of not less than five percentum (5%) of the amount of the base bid must accompany each bid.

The Easton Utilities Commission of Easton, Maryland reserves the right to reject any or all bids or sections of bids as deemed to the best interest of the Town of Easton, Maryland.

Sheldon E. Dietert
Secretary-Treasurer

William H. Corkran, Jr.,
Town Engineer.

OFFICIAL PROPOSALS

Bids: June 1961

Notice to Water Turbine and Water Turbine Driven Generator Manufacturers Water and Power Development Authority—West Pakistan Indus Basin Development Mangla Dam Project

The Water and Power Development Authority West Pakistan expect to issue tender documents within the next six months for the manufacture and delivery C.I.F. Karachi of three 138,000 horse power, vertical shaft, Francis water turbines, and within the next year for the manufacture and delivery C.I.F. Karachi of three 100 megawatt generators to be driven by the turbines, and the machines to be installed in the Mangla Power Station.

Manufacturers interested in tendering for either:

(i) the water turbines
(ii) the generators

or (iii) both the water turbines and the generators are invited to apply at once for a Summarized Description of the Work either to:

The Chief Engineer,
Mangla Dam Project,
P.O. Mangla Headworks,
District Jhelum,
West Pakistan.

or to the Mechanical and Electrical Consultants,

Messrs. Preece, Cardew & Rider,
8, 10 & 12, Queen Anne's Gate,
Westminster,
London, S.W.1.
England.

in association with the Consulting Engineers for the Mangla Dam Project,

Messrs. Binnie, Deacon & Gourley,
Artillery House,
Artillery Row,
London, S.W.1.
England.

Manufacturers, who, after studying the Summarized Description, wish to be placed on the list of Tenderers, should send an application, in English, to the Mechanical and Electrical Consultants, giving details of their resources and of their experience in the manufacture of large vertical shaft water turbines and/or large vertical shaft water turbine driven generators including the magnitude and description of Work which they have carried out, time when

OFFICIAL PROPOSALS

manufactured, and the names of the Employers and Consulting Engineers responsible.

Applications to be placed on the list of Tenderers must reach the Mechanical and Electrical Consultants not later than the end of June, 1961. Those firms considered to have sufficient experience and resources will be sent the tender documents in due course.

Bids: November 1961

Indus Basin Project West Pakistan Water and Power Development Authority Gates for Mailsi Siphon and Sidhnai Barrage

The Authority invites firms who consider themselves qualified by past experience in the design, manufacture and erection of gates for barrages to apply for prequalification to tender for the gates for the above mentioned works.

The works form part of the settlement plan being financed by the Indus Basin Development fund, which is administered by the International Bank for Reconstruction and Development.

The gates are likely to be as follows:

Mailsi Siphon
Hand operated gates
24 Taintor gates, 60 feet wide, 7 feet high.
8 Vertical lift gates, 13 feet square.
Sidhnai Barrage
Electrically operated
15 Vertical lift gates, 40 feet wide, 12 feet high.
14 Vertical lift gates, 24 feet wide, 10 feet high.
Hand operated
16 Vertical lift gates, 32½ feet wide, 14 feet high.

The Authority plans to invite tenders for these gates about November 1961, as two separate tenders.

Applicants should apply in writing before the 1st September 1961, to:

The Project Director (Barrages),
19 Queens' Road,
Lahore.

with a copy to the Consulting Engineers, Messrs. Coode & Partners, 2 Victoria Street, London, S.W.1. from whom further particulars can be obtained.

Applicants must supply full details of their previous experience in the design and work of this nature.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• POSITIONS VACANT

Structural Engineer-Midwest consulting firm seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. Preference will be given to applicants with practical experience. Permanent position with established firm in business since 1929. Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245. Engineering News-Record.

Estimator-Engineer. Permanent position for man with experience in slip-form construction, both in the field and in cost estimating. Capable of take-off and pricing from preliminary and working drawings. Salary in line with background and experience. Engineering degree or registration is not a requisite. P-6637, Engineering News-Record.

Architectural or Civil Engineer for development of engineering standards and data applicable to structural building material. Interesting opportunity Washington, D. C. area. Age 26-35. Degree required and registration desirable. Send photo and resume to P-6654, Engineering News-Record.

Wanted—Competent and experienced Engineers on water works, water treatment, sewers and sewage treatment. State experience, salary required and when can report. P-6666, Engineering News-Record.

• POSITION VACANT

Graduate civil engineer or geologist with at least 2 years experience in caisson construction or foundation test drilling capable of project supervision. Contact American Foundation Corporation, 5204 East 25th Street, Indianapolis, Indiana.

Steam Power Plant Design Engineer—Minimum 5 years responsible experience, including supervision of personnel, in design of steam power plants. Progressive consulting engineering firm offers permanent employment with opportunity for personal development and advancement potential. Submit resume and salary requirements to Stanley Engineering Company, Muscatine, Iowa.

Civil Engineers—The International Cooperation Administration is seeking Civil Engineers as Highway Specialists for positions with United States Operations Missions in the Far East and Africa. Applicants must be registered Civil Engineers with minimum 5 years highway construction experience, not over 55 years of age, and able withstand the rigors of an overseas assignment. Knowledge French desirable. Transportation dependents and household effects paid by ICA. Tax-free housing allowance. Cost of living allowances may be included. Salary range $10,000 to $13,000 per annum plus post differential up to 25% of base salary. Write: Chief of Employment, Box ENR-6, International Cooperation Administration, Washington 25, D. C.

(Continued on the following page)

DON'T FORGET THE BOX NUMBER

BRIDGE AND HIGHWAY ENGINEERS

Several experienced highway bridge and road engineers wanted by established Consulting Firm, Chicago location. Excellent benefits and permanent position for qualified applicants. Give education, experience and approximate salary requirement.

P-6720, Engineering News-Record
645 N. Michigan Ave., Chicago 11, Ill.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

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The advertising rate is $45.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

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Subject to Agency Commission.

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Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

• POSITION VACANT

(Continued from preceding page)

Bridge and Highway Designers; Survey Personnel. We have a number of openings for experienced Bridge and Highway Designers, and for personnel experienced in preliminary surveys for highway projects. No arbitrary length of previous employment is established; selection will depend on the design know-how and judgment a man has absorbed from his own particular experience. Only engineers and surveyors with a sense of responsibility and a professional approach to their duties will be accepted. Long range backlog of work available, both domestic and foreign. Salaries depend on the individual and are individually negotiated. Increases are based primarily on merit. Other benefits are liberal. Write or telephone for application blank to—Capitol Engineering Corporation, Dillsburg, Pennsylvania.

Senior Design Engineers (Mechanical): Works in Public Works Department of State of Connecticut. Directs the work of Design Engineers & consultants. Annual salary approx. $6300 to $8880. Must be United States citizen. Write to Robert G. Mack, Connecticut State Personnel Department, Room 405, State Office Building, Hartford, Connecticut.

Estimator for General Contractor. Washington, D. C. area. To take complete charge as head estimator. Must be experienced in all phases of construction. Fine opportunity with growing concern for aggressive individual. Send resume stating experience and references of former employers. P-6705, Engineering News-Record.

Electrical Engineer—Experienced in design of electric transmission, distribution and substation facilities. Progressive consulting engineering firm offers permanent employment with opportunity for personal development and advancement potential. Submit resume and salary requirements to Stanley Engineering Company, Muscatine, Iowa.

Wanted—Project Manager, Project Superintendent and Asst. Comptroller for large construction firm specializing in multi-million dollar concrete and steel frame buildings and housing projects throughout U.S.A. Offices in Texas, Washington, D. C., and California. Also have opening for divisional office supervisor requiring thorough experience in estimating, purchasing and construction. Give resume of education, experience, age, references and salary requirement. Reply to P-6716, Engineering News-Record.

Sanitary Engineer to handle technical liaison and correspondence and to prepare bids and proposals for the sale of waste treating and handling equipment and related items. Prefer MS and appropriate experience. Send complete details. Yeomans Brothers Company, 1999 North Ruby Street, Melrose Park, Ill.

Construction Superintendent—Must be top field engineer, with degree, for a gunite hotel job in St. Thomas, Virgin Islands. Minimum of 4-6 months with choice of a permanent connection. Salary $250. per week plus living accommodations. Essential that applicant be free of racial prejudices. Immediate availability. Send complete resume airmail to Airform Development Corp., Box 2516, St. Thomas, Virgin Islands. Include phone.

• EMPLOYMENT SERVICES

Want greater opportunity? 200—1,000 new jobs reported monthly. Get free copy. National Employment Reports, 20 E. Jackson, 902-B, Chicago 4, Ill.

• POSITIONS WANTED

B.S.C.E., P.E., 32, 6 years exp. inspection, storm sewers, highways. Desires position West, Southwest. PW-6299, Engineering News-Record.

Registered Str. Civil Engr. (2 states) wants to associate with established Consultant to form an alliance to design bridges, highways, buildings, etc. 30 years experience, 16 years in supervision. PW-6638, Engineering News-Record.

Registered Str. Engr. 31 years experience in bridge, buildings, highways and industrial plant layout design and supervision. 17 years in supervision, construction, estimating and specification writing included. Will relocate. Available in 2 weeks. PW-6642, Engineering News-Record.

Construction Supt.—31 years experience all phases Bldg. Construction. Will relocate, Midwest preferred. PW-6618, Engineering News-Record.

Construction Manager—Good record as successful field manager. Twenty years experience building construction supt., project manager, general supt. with top grade contractors. Engineering background. Presently employed. Profit sharing connection desired. PW-6608, Engineering News-Record.

Project Manager, complete administration and supervision incl. negotiations & estimating, 24 yrs. hvy. constr. major projects U.S. & O.S. PW-6649, Engineering News-Record.

Construction Manager, General Superintendent, Chief Estimator—25 years experience—public & industrial building construction—from bidding thru completion—resume on request—salary $14,000. PW-6635, Engineering News-Record.

BSCE, MSCE+, PE, RLS, age 33—Varied experience in design, maintenance and construction. Min. $9600. Resume on request. PW-6679, Engineering News-Record.

Construction Executive: age 44; twenty-three year background. All phases of industrial, commercial, and institutional construction. Bids to completion, contract negotiation, construction management, cost accounting, and financing analysis. Presently employed. Desire change and connection with young, growing, aggressive organization with possible future participation. Would also consider old line established company in management or branch management capacity. Minimum $18,000 annually. References. PW-6685, Engineering News-Record.

Contractor's Engineer, Project Manager, estimating. Graduate CE Licensed. Bid to completion experience. Heavy construction, buildings, missile projects. Wide experience in the preparation of construction claims including negotiations and arbitration cases. Compilation and analysis of construction job data essential for attorneys in court actions. PW-6687, Engineering News-Record.

Field Supt. Rock or Dirt. Prefer rock, highways, dam, pipe. Age 43. 24 yr. experience. Domestic or foreign, resume on request. PW-6633, Engineering News-Record.

Civil Structural Engineer age 36 P.E. 10 years experience steel, reinforced and prestressed concrete design, construction and supervision. PW-6689, Engineering News-Record.

Graduate, Registered Civil Engineer, age 38, 15 yrs. highway and related experience desires employment in southeastern or southwestern states. Foreign employment will also be considered. PW-6660, Engineering News-Record.

• POSITIONS WANTED

BCE, age 29, 5 yrs experience. Desires position in contract handling or marketing. Available now. Will relocate. Resume on request. PW-6599, Engineering News-Record.

Senior Civil Structural Engineer, Regist. Broad experience in large bridges; indust., comm., instit. bldgs, etc. Handles multi-million dollar jobs from A to Z. Avail. for partnership or respon. position. PW-6591, Engineering News-Record.

Chief Estimator—25 years experience all phases Building and Heavy Construction—qualified to handle job from bidding to completion—available immediately—will relocate to suit. PW-6550, Engineering News-Record.

Construction Supt. General Construction. PW-4482, Engineering News-Record.

Electrical Project Engineer Superintendent with background of estimating, cost control, labor relations, design, engineering, on heavy construction, chemical refineries, industrial plants, tunnels, bridges, substations, O.H. and U.G. distribution systems, steel mills, with engineers and constructors. Details on request. PW-6619, Engineering News-Record.

General Contractors' Superintendent—age 43 —experienced power plants, sewerage plants, industrial. Prefer Illinois-Indiana location. Will relocate to suit. A-1 references. Reply to PW-6706, Engineering News-Record.

Construction Manager: 13 years chemical, textile & industrial experience. BS and MS Civil Engineering. Professional Engineer NY & Delaware. Will relocate in N. E. US. PW-6707, Engineering News-Record.

Dirt Foreman, age 34, have 10 years varied const. exp., grading, surveys, inspection, office. Prefer Calif. S.W., OK, PW-6698, Engineering News-Record.

Materials Engineer, soils, concrete, asphalt. 11 years experience as supervisor. Have worked for contractors and consultants in U.S. and overseas. PW-6694, Engineering News-Record.

Material or Purchasing Manager: 25 years exp. including Got. contracting. BS Bus. Adm., 3 yrs. ME. Age 46. PW-6701, Engineering News-Record.

Engineer—Estimator—Purchasing Agent desires to relocate where character, integrity, initiative and drive will be recognized and rewarded. I am looking for an established construction company which is being revitalized. To such a company I will bring a fresh outlook, talent, ability and a wealth of know how and enthusiasm. Presently employed in Cleveland, Ohio. Salary and commission or partnership desired. Will relocate. PW-6703, Engineering News-Record.

Superintendent—Experienced in excess of forty completed contracts for highway and heavy earth moving, bridges. Complete project planning and execution. Will relocate. Reply PW-6727, Engineering News-Record.

Structural Engineer, Graduate C.E., 36, 10 years design exp. in conc. and steel for industrial structures. Desire position West-coast, West. PW-6729, Engineering News-Record.

Chief Hydraulic Engineer. 20 yrs. exp. complete charge all phases development, reports, design, construction of hydroelectric, pumpback power, water supply, flood control & irrigation projects. Civil & Struct. lic. PW-6728, Engineering News-Record.

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Challenging overseas position, with an excellent opportunity for professional development, immediately available. Require the services of a graduate Mechanical Engineer on the supervision of construction of the Powerhouse on a hydro-electric project in Thailand. Prefer engineer with five or more years of experience on hydro-electric dams and powerhouses.

Position duties will include the installation of the penstocks, radial gates, fixed wheel gates, hydraulic turbines, governors and the mechanical features of the switchgear. 24 Month Contract, living quarters furnished, excellent salaries, opportunity to visit foreign countries.

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This position offers ideal working conditions and attractive employee benefits. Salary open.

Send complete resume to

P6718 Engineering News-Record
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Fabricator of unique line of stock-designed structural steel products seeks aggressive representative immediately for Central and Atlantic areas, excluding Pa., Del., N. J. and New England. Will also consider representatives for other sections of country. To contact architects, structural engineers, contractors, builders, etc. Should have own qualified estimators, detailers, draftsmen, and erectors available. Product advertisements draw tremendous response from all over the world, and initial leads will be furnished.

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P6702 Engineering News Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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B.S. in CE or ME. CE preferred, Minimum of 5 years experience in Chemical Plant Design Engineering or related industrial experience. Position requires knowledge of structural and concrete design for equipment supporting structures, piping and pressure vessel design. Must have ability to prepare drawings, bills of materials, and construction specifications, and be willing to do board work.

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B.S. in CE or ME. Minimum 2 yrs. experience in preparing drawings and bills of materials for plant projects. Position requires considerable board work.

Send detailed resume, including present and required salary to:

BOB RISTAU
P. O. Box 4026
Pittsburgh Plate Glass Company
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An employment advertisement in this EMPLOYMENT OPPORTUNITIES section will help you find the engineers you need. It's an inexpensive, time-saving method of selecting competent personnel for every engineering job.

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DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

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ONE USED 750 KVA UNIT SUBSTATION

with 15 KV. 3 pole two position selector switch. Open ventilated dry-type transformer section designed for 750 KVA, 60 cycles 3 phase, high voltage—13800 volts Delta, low voltage WYE 277/480 volts. Reply by phone or mail to:

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2—MODEL 30C VULCAN PILE HAMMERS

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FS-6719, Engineering News-Record

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W-6676, Engineering News-Record

Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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2500 PCS. BETH.—DP2—20', 25', 30', 35', 40' & 60'
1200 PCS. ZP38-ZP32—20', 32', 36', 40', 50', 60'
600 PCS. ZP27—20' 26', 31, 40', 45', 60'
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STOCKS: N. Y.—BOSTON—BUFFALO
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DIESEL LOCOMOTIVES & CRANES
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We, the People

TOO MANY SHOCKING EXAMPLES OF DISHONESTY, selfishness and callous indifference to the rights of others come to light daily to lay all the blame on the acts of a few crooks. The fact is there has been a dangerous slipping of moral standards everywhere. It is not enough just to hold one's nose over the odor rising out of the Senate investigations into the unconscionable costs and delays in our missile program. Something more basic than new laws, new regulations and new governmental machinery is vitally needed.

It is time that "we, the people" took a long, hard look at our soft, flabby and elastic principles of morality. It is time also to dust off the age-old concept of "common weal," so basic to our prideful heritage, and rededicate ourselves to keeping ourselves and our nation healthy, strong and free.

The McClellan committee investigation of the missile program wound up last week after revealing some high-handed, costly and voracious practices of a few local building trades unions. But it should not be overlooked that the committee also placed some of the blame on the "silence and inaction" of management.

In the last analysis it is "we, the people" who are at fault, who are losing our sense of values and forgetting the difference between right and wrong. As a government "of the people, by the people and for the people," we as a nation are nothing more nor less than what "we, the people" are.

It is time that we woke up and put an end to the inner erosion of our moral fiber. Otherwise, the nation for which our forefathers pledged their lives, their fortunes and their sacred honor will be a hollow legacy to leave our children.

Ethics Is Integrity

THE PROPOSAL OF THE ASCE to supplement its code of ethics with a series of specific interpretations or examples for each code article (ENR Apr. 20, p. 24), represents a constructive forward step. It is well named a "Guide to Professional Practice." The briefly worded code articles necessarily leave many situations in a gray area of uncertainty, and subject to a variety of interpretations. The Guide won't cover all of these, but it should definitely reduce their number.

The Guide, however, has another and equally important potentiality. By listing a variety of situations it tends to bring into closer focus the fact that ethical conduct is for everybody, and not just for employers who deal with clients. That has always been implicit in the code, but it was not as explicit as it now can be with aid of the Guide.

Ethics for engineers is properly concerned with business practice technicalities, but even more important it is concerned with personal attitudes and practices. These will always be right if they stem from a sense of integrity. And whether an engineer is an employer or an employee, integrity—in doing a job, in protecting the public, in dealing with others—is the key to his professional status.

Too little regard for integrity led to the TV quiz scandals, too little courage to insist on integrity led to the plight of those involved in the electrical price-fixing debacle. Such a lapse in ethics would be disastrous for the engineering profession, where ethics is almost wholly a matter of personal integrity. No code of words can spell this out completely, but the new ASCE Guide to Professional Practice measurably aids and abets the idea. On that score alone it is a worthwhile document.

National Highway Week

THROUGHOUT THE NATION next week; highway officials will hold open house, make speeches and conduct road tours. It's the first National Highway Week, ordered by President Kennedy to emphasize the importance of highways to the nation's welfare. It offers a rare opportunity to inform the public on the highway program. And it holds the promise of gaining support for the kind of major roadbuilding effort the nation requires.

This support will be forthcoming when the public has the facts and is convinced that the highway program is in good hands. The various activities of National Highway Week should be planned so that highway people—government officials, engineers, contractors and all—can furnish these facts and justify their stewardship of the program.

This spring is an appropriate time to develop better public understanding of the highway program.

The critical fight for financing to complete the Interstate system is still in progress. And the program is still under fire in various quarters, including some segments of the national press.

Everyone who is convinced that the highway program must be completed on schedule and as planned should take advantage of National Highway Week to explain and sell the program to his neighbors and friends. There's a strong sales story to tell:

Benefits from highways *do* far outweigh construction costs; the vast majority of persons involved *are* honest; improved highway transportation *is* vital to a sound national economy; the present program *is not* too big for present needs—it may not be big enough considering the additional traffic that new facilities are always bound to generate.

The first National Highway Week offers the best opportunity yet to tell this story. It could be the last National Highway Week necessary if the story is told effectively.

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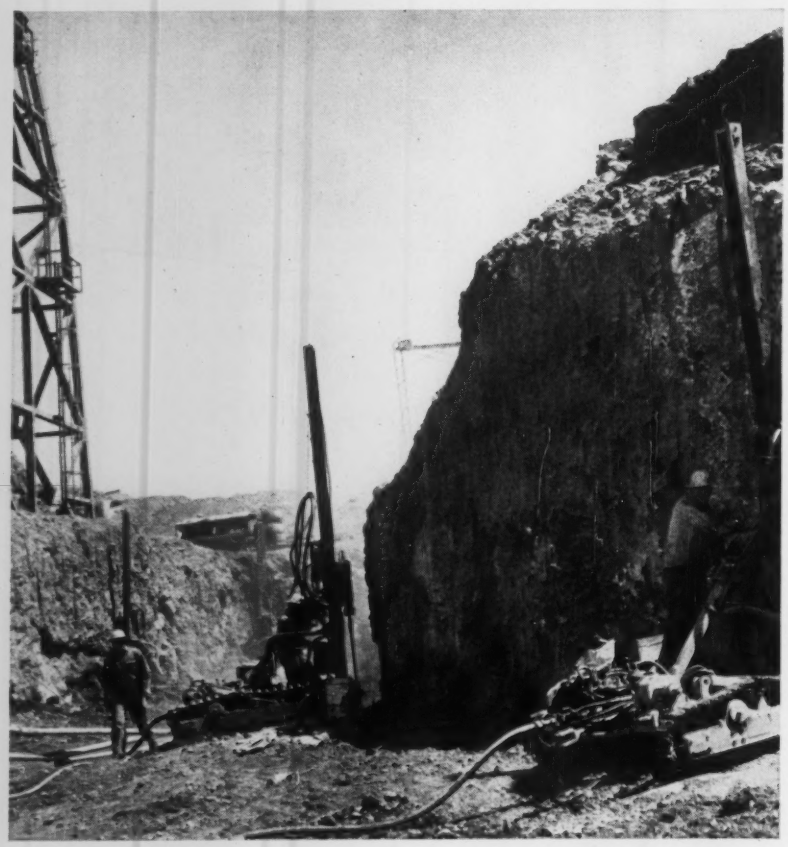

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